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Collaborative Research Support Program

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"***Assets, Cycles and Livelihoods (ACL): Addressing Food Security in the Horn of Africa and Central America***" Research Project, Broadening Access and Strengthening Input Market Systems-Collaborative Research Support Program (BASIS-CRSP) and the Institute for Development Research (IDR), Addis Ababa University.

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Introduction and Overview

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In June 2003 the BASIS/IDR research program held a workshop in Bahir Dar town, the regional capital of the Amhara National Regional State, Ethiopia. For more than three years the BASIS/IDR project has been conducting research in eight Peasant Associations/ kebeles of South Wollo (6) and Oromiya zones (2), the last two years under a research project, titled "Assets, Cycles, and Livelihoods: Addressing Food Insecurity and Poverty in the Horn of Africa and Central America." The workshop provided an opportunity for the US BASIS and Ethiopian researchers to present their preliminary findings to an audience of policy makers and officials from the international donor, NGO, and government communities. What follows in this volume are summaries of the research that the BASIS/IDR project has been doing in the Amhara Region, as well as a contribution from another project in the region that is carried out by the International Livestock Research Institute (ILRI) and the International Food Policy Research Institute (IFPRI). We are grateful to Dr. Sam Benin of ILRI for representing his collaborative program and for presenting a paper based on the study's findings.

Not all of the presenters at the workshop are represented in these proceedings. An examination of the schedule in Annex B shows the full list of presenters, but some of them did not have papers that were ready to include in the proceedings. Nonetheless, the organizers (Little and Negatu) are grateful to these individuals and the other workshop participants, many of whom are 'on the front lines' of addressing poverty and food security problems in the Amhara Region. We are very appreciative that they took time from their busy schedules to attend the workshop and contribute to workshop discussions. We are especially grateful to the Regional Bureau for Rural Development, Amhara National Regional State, and Amhara Regional Agricultural Research Institute (ARARI) for helping to organize certain sessions and inviting government officials and policy makers.

1. The Assets, Cycles, and Livelihoods Project

The Horn of Africa (HA), including Ethiopia, includes some of the world's poorest rural populations, most volatile political conflicts, and extreme cases of food instability (the following section is based on Little et al. 2002). The BASIS 'Assets' project builds on existing studies and databases in South Wollo and Oromiya Zones, Amhara National Regional State, and extends the Ethiopian work in the Horn of Africa to include analyses in another region, Central America (Honduras). External shocks—droughts in the Horn of Africa and hurricanes in Central America—have devastating effects on the lives and livelihoods of rural people. For some people, the passage of time permits recovery. Subsequent years of good rainfall and agricultural productivity can be sufficient to reverse trends of asset depletion and allow recovery from climatic and other disasters. For others, neither time nor markets offer the prospect of recovery. The objective of the BASIS 'Assets' project is to improve understandings of the ways in which asset cycles and poverty affect and are affected by factor market processes. As an empirical backdrop, the project highlights the theme of 'shocks' (climatic and other) to better assess the dynamics of these cycles under the harsh realities that confront some of the world's poorest populations. The ultimate goal of the study is to identify policies that allow impoverished households to escape the debilitating cycles of poverty, asset depletion, and food insecurity.

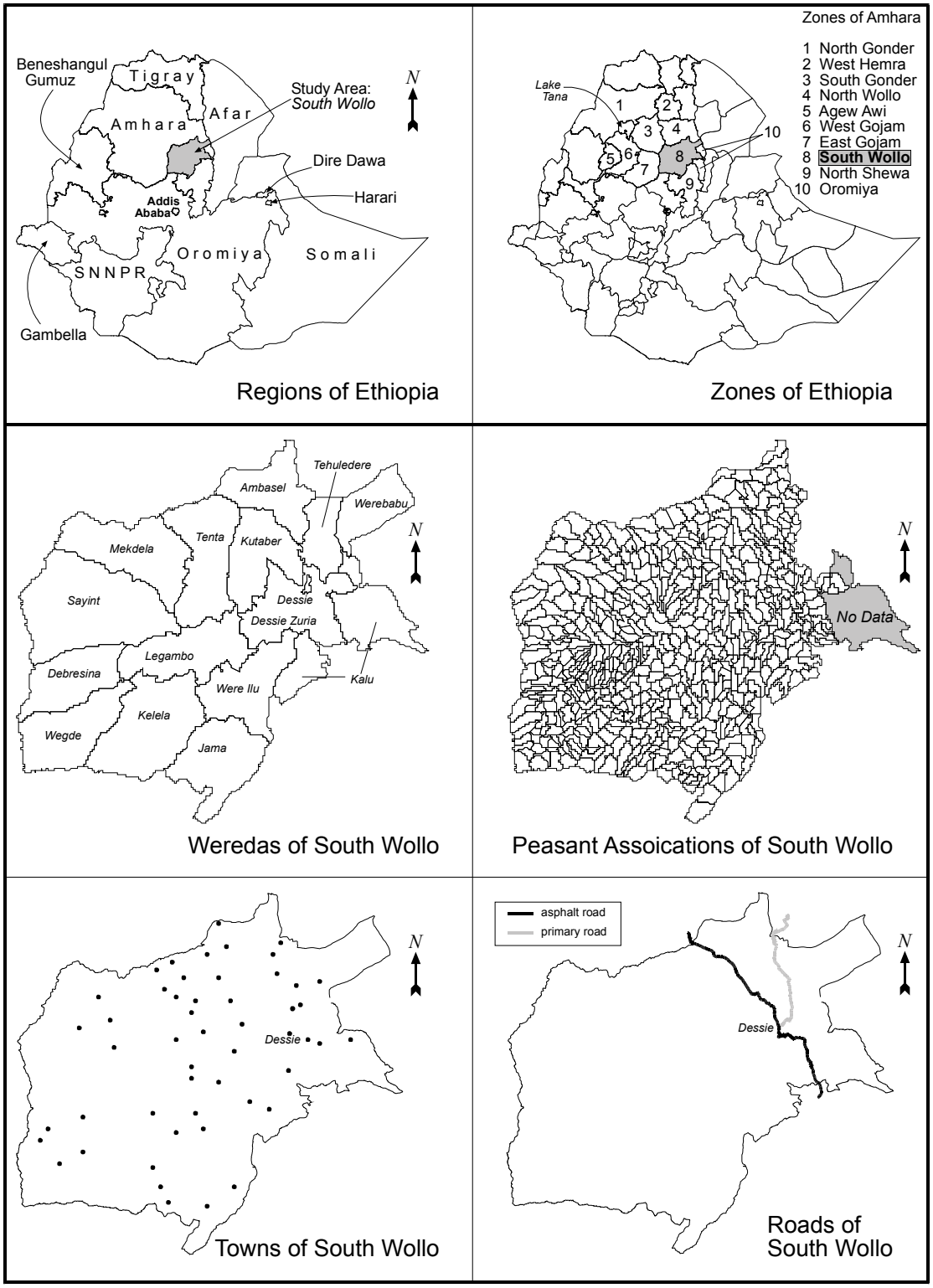
The South Wollo (Wello) area (see Map 1), often referred to as the buckle of the country's famine belt, assumes an important — if not infamous — role in many of the global debates about food insecurity and famine, including those of noted economist Amatrya Sen. While the South Wollo study has generated several important conceptual and methodological advances, it also has raised important unanswered questions about the effects of poverty traps on shock (drought) recovery, the role of assets in shock mitigation, and the nature of risk management practices in the absence of well-

established markets. By emphasizing both quantitative and qualitative methods, the 'Assets' project in Ethiopia (South Wollo/Oromiya) builds on studies of asset cycles, shocks, and poverty in three innovative ways. It emphasizes a multi-round, longitudinal household study that nearly will cover the complete recovery cycle (2000-2003) following the devastating drought of 1999. In this research up to three individual economic agents (including spouses and older sons and daughters) are interviewed within each household, rather than just the household head; and each household is geo-referenced to allow spatial/GIS analyses of socio-economic patterns. Second, the project highlights intensive ethnographic work among a small sub-sample of households from the larger survey to capture important qualitative data and insights that cannot be captured through formal questionnaires. Finally, the household study has been supplemented by community-based assessments in all but two of the study sites, and by a regional market and micro-enterprise study in the region.

2. The Workshop Papers and Presentations

The papers presented in this volume are only summaries of larger pieces of work conducted in the Amhara National Regional State (Ethiopia), many of which are still in progress. We asked that each presenter who was willing to share their paper, prepare a brief summary of their research findings, which often was an abbreviated version of a much larger research report. The objective here is not to present finished, polished papers but to provide readable versions that distill the most important research results. Our intended audience is the active network of BASIS and Ethiopian researchers and the larger Amhara regional development community who are interested in applicable research findings and policy solutions. In some cases, we even asked presenters to merely provide an outline of their presentation and findings, rather than wait to have them complete a longer paper. Most of us are still in the midst of our field studies; indeed, even a team of BASIS/IDR researchers went straight from the Bahir Dar workshop to the South Wollo and Oromiya Zone sites to continue interviews and data collection. When in doubt we erred on the side of timeliness for these proceedings, rather than scholarly and editorial refinements.

The papers represent different aspects of the 'Assets' project, but most address two major, interrelated development problems: (1) food insecurity; and (2) poverty. The authors highlight different dimensions of these problems: gender (Stone and Castro), social and spatial (Little and Roth and Mogues), technological (Workneh), land tenure (Yigremew), micro-enterprise (or lack of) (Gebre-Egziabher and Demeke), and asset issues (Little). Once again, the findings are very preliminary but not surprisingly they consistently demonstrate how interrelated (and constraining) different aspects of poverty and food insecurity are. Poor households are labor, land, food, and oxen-constrained, so they are forced into unsustainable/survival types of agricultural (Yigremew, Roth and Mogues and Workneh) and non-farm activities (Gebre-Egziabher and Demeke); are unable to access the social and financial capital (credit) to help them escape the cycle of poverty/food insecurity (Stone); fail to reach sustainable levels of assets that can help them withstand the next drought disaster (Little); and are heavily dependent on food aid and government assistance (Roth and Mogues). Untangling the different factors responsible for food insecurity and poverty in South Wollo and Oromiya Zones reveals multiple layers of causality and contingencies, as Roth and Mogues show in their multiple regression model of food



Map 1. South Wollo Zone (and Oromiya Zone), Amhara Region (based on Shin 1999)

insecurity. In looking at the Ethiopian data, one easily is caught in circular, tautological explanations—for example, households are poor and food insecure because they do not have sufficient labor and assets to expand cultivation, but they cannot support larger, labor-rich households to cultivate more land because they are too poor to feed extra mouths, and the story goes on. . . . .

Regardless of the depth of food insecurity and poverty in South Wollo and Oromiya, the papers in the volume point to a number of larger policy issues that clearly impact local welfare. One that was brought up in at least two of the workshop presentations is land policy, particularly the government constraints that are placed on land transfers. The unorthodox practice of 'poorer' farmers acting as landlords for better off farmers who sharecrop-in land is a stark manifestation of current land tenure policy. Asset-poor households often stay in the rural areas rather than move to other locations, because under current policies their land is likely to be reallocated to another farmer if they move out of the area. A second macro-policy issue that looms large in several of the presentations has to do with the effectiveness of current food aid programs. Some presenters see little alternative to food aid in the short run but would like to see better targeting, while others argue that it creates strong market distortions and dependencies and should be limited to extreme emergencies.

The lack of attention to the non-farm sector and small towns until very recently was seen as a strong policy weakness that has retarded income growth and food security. Several of the papers came to the conclusion that poverty alleviation and food security hinge as much on improvements in the non-farm sector as on increased agricultural production (see Little, Roth and Mogues, Stone and Castro, and Gebre-Egziabher and Demeke). Yet, as the paper by Gebre-Egziabher and Demeke at the workshop demonstrates lack of credit for micro-enterprise, infrastructure in small towns, and training and services for the non-farm sector has kept the region overly dependent on a fragile and volatile agricultural sector. Women entrepreneurs would especially benefit from increased support for micro-enterprises and other non-farm income activities.

3. What Lies Ahead

The workshop presenters and discussants were quite frank in their appraisals of what research questions remain to be answered; what kinds of work BASIS/IDR should undertake in their last year of the project (2004); and what policy options remain to be explored. Clearly, we still have not answered many questions about the persistent nature of poverty and famine in the region, and some require research methods--case study, ethnography, and other qualitative approaches--that cannot be addressed by a household survey. How many households (especially female-headed) were pushed below into poverty by the 1999 drought and how many will or will not recover from it? What role does asset management play in coping and recovering from climatic 'shocks'; and is the current land tenure really a significant constraint to increased production and income in the area?

The role of credit in asset recovery and assisting households to escape from poverty also needs to be fully assessed. If the development of the region requires a much better integration of farm and non-farm activities, what kinds of targeted programs and investments can help to strengthen rural (farm)-urban linkages. Finally, it was recognized at the workshop that any development program and policy interventions in eastern Amhara during the next five years must balance short-term exigencies (e.g., emergency-based food aid) with medium- and long-term investments in human capital (education), infrastructure (roads, markets, and electricity), and appropriate agricultural technologies to break the 'merry-go-round' of food aid and dependency. Droughts are a *normal* occurrence in the region but the social and economic devastation that they create in the area every 3-4 years is *abnormal*.[1] How households and communities manage these natural disasters in the future, without additional impoverishment, will depend largely on the assets (economic, human, and social) that they control to confront the next 'shock.' The key for the BASIS/IDR 'Assets' project will be to determine

[1] In the last decade South Wollo/Oromiya have experienced drought-like emergencies every 2-3 years, even when rainfall amounts have deviated only 10-15 percent from the long-term norm. Belg-producing areas, where cultivation takes place during the short rains, have been especially affected.

what mix of programs, policies, and targeted activities enhance asset recovery and avoid wasteful asset depletion during emergencies.

4. References

Little, Peter D., with assistance from Abdel Ghaffar M. Ahmed, Michael Carter, Michael Carter, and Workneh Negatu

2002 **Building Assets for Sustainable Recovery and Food Security**. BASIS Brief, Number 5. Madison, WI: BASIS Research Program, Department of Agricultural and Applied Economics, University of Wisconsin-Madison (available on BASIS Webb page: **http://www**.basis.wisc.edu).

Shin, Michael.

1999 **Using a Geographical Information System within the BASIS Research Program in Ethiopia.** Madison, WI: BASIS Research Program, Department of Agricultural and Applied Economics, University of Wisconsin-Madison (available on BASIS Webb page: http://www.basis.wisc.edu).

I. Research Methodology and Study Areas of the BASIS/IDR Household Study in South Wollo and Oromia Zones, Amhara Region Ethiopia[2]

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1. Objectives of the household study

The objective of the household study in south Wollo and Oromia zones is to investigate the relationship between assets, livelihood and food security under different scenarios of drought shocks. The ultimate goal of the study is to identify policies that improve household access to land, labor and capital (physical, financial, human and social) markets and to improve performance of the markets (see Little et al. 2001).

The research is a longitudinal study aimed to capture changes in access to resources, resource use, factor market performance and their relations with food security over years and seasons under different socio-economic and biophysical settings.

2.The Study Areas

The USAID funded BASIS Project in South Wollo began its research activities in 1998-1999 with a market study and a set of community assessments, but did not begin the household study until June 2000. The current BASIS project builds on an existing household study that now has three years of systematic data collection activities.

The areas around Dessie, the capital town of South Wollo zone, are located in the eastern Amhara region of Ethiopia, and were selected for the following reasons:

- Dessie is close enough to important markets and to the main market road to Addis Ababa to allow the study of agricultural policy and markets on resource use, food productivity, and adoption of commercial inputs associated with new farm technology;
- land use management changes rapidly along the highland-to-lowland transect within short distance,;
- choice of Amhara region is also expected to allow BASIS to observe and contribute to the region's decentralized economic planning and development.

The longitudinal survey is conducted in four specific woredas located in South Wollo and Oromia zones. The woredas have generally different characteristics in terms of agroecology, production potential and access to infrastructure.

The three traditional agroecological zones are used to stratify the study areas. The agroecological zones are (i) *Dega* (high altitude, moist and low temperature), *Woinadega* (mid-altitude, sub-moist and medium temperature), and *Kola* (low-altitude, semi-arid and high temperature). Another important factor considered in selection of the study areas was the two growing seasons in the country: (i) the Belg (planting in February/March to harvesting through June - August/September); (ii) Meher, planting June – August to harvesting in October-January). Certain areas receive only Meher or Belg rains while certain areas receive both *Meher* and *Belg* rains.

Thus, four woredas were selected for the study purposively with the aim of representing agroecologies described. These are (i) Legambo woreda (d*ega/Wurch*) (2) Dessie-Zuria woreda (w*oinadega/dega* (3) Jamma *woreda* (d*ega*) and (4) Bati *woreda* (k*ola*). Except Jamma woreda, a food surplus area, the rest of the *woreda* selected for this study were included in the 1999 community assessment. Jamma woreda is included in the household survey for the reason that it is one of the areas in South Wollo, with better-off agricultural potential.

[2] A paper prepared for the Workshop on BASIS/IDR Household Study in Eastern Amhara Region, held on 17-18 June 2003, Bahirdar, Ethiopia.

3 Research Design and Data Collection

In order to effectively trace changes based on reliable data recall, repeated surveys of the same households have taken place every four to six months for the past two years. But, due to irregular patterns of rainfall (e.g. drought in 1999/2000; failure of the short season (*Belg*) production in 2000), and the resulting irregular seasonal activities, and a longer period required for farmers to thresh harvested crops and know yield data, the repeat surveys were done almost every four months, i.e. three times per year. Thus starting in June 2000 six rounds of household surveys were conducted until June 2002. The seventh round is to be under taken in June/July 2003 to update data on changes since the sixth round survey was undertaken one year ago.

Sampling

In each woreda two PAs (Peasant Associations) were selected purposively on the basis of proximity to the woreda capital town: one PA is nearer (5-9 Km.) to the capital town and the other relatively far (15-30 Km.) from it. The selection of the PAs was done in consultation with the Woreda officials and extension experts of the Bureau of Agriculture. From each PA 56 households were selected randomly expecting a total attrition rate of about 28 % by the final (sixth) round survey that would assure us a minimum of 40 households to participate in all rounds of the household surveys. Of the 448 original households, 421 remained in the study as of June 2002 (Tables 1 and 2). The farm households were selected from the sampling frame constructed

Table 1: Sampling Frame and Sample Size

Woreda	Kebele (PA)	Landless Household	Landholding Households	Sampling frame	Sample size	Sample as % of the population
Jamma	Yedo	135	1431	1566	56	3.6
	Tulumojo	144	1037	1181	56	4.7
Bati	Kamme	45	618	663	56	8.4
	Chachato	125	349	474	56	11.8
Desse-Zuria	Tebasit	840	1515	2355	56	2.4
	Gerado	250	807	1057	56	5.3
Legambo	TachAkesta	72	1256	1328	56	4.2
	Temu	216	1526	1742	56	3.2
Total		1827	8539	10366	448	4.3

PA = Peasant association; Woreda is equivalent to district

Note: The average proportion of female-headed households in the sample households of the study is 24 %, the highest proportion being 33 % in Legambo woreda and the lowest, 14 %, in Bati woreda.

Table 2: Sample Size at the Sixth Survey Round.

Woreda	**PA/Kebele**	**Sample size in the final survey**	**Total dropout by the final survey**
Legambo	Temu	52	4
	Tach-Akesta	54	2
	Total	106	6

Dessie-Zuria	Tebasit	47	9
	Gerado	53	3
	Total	100	12
Bati	Chachato	56	
	Kamme	54	2
	Total	110	2
Jamma	Tullu-Mojo	54	2
	Yedo	51	5
	Total	105	7
Grand Total		**421**	**27**

from the list of PA-registered farm households and the list of farm households who are not formally registered with PAs, but engaged in farming using land plots they obtain through different mechanisms like gifting, sharecropping or renting (see Table 1). The latter list was constructed on the basis of information provided by PA leaders and other informants. The sample size in the sixth survey is shown in Table 2

The Surveys

Data were collected from the members of randomly selected households using formal and structured questionnaires that were first pre-tested and improved. The data content of each survey round is given in Table 3. In addition to these data, a sub-sample of detailed, open-ended interviews have been conducted with about 40 households from the larger sample (these are described at the workshop in the presentation by Priscilla Stone).

4. Some Characteristics of the Study Areas

Table 4 shows the characteristics of the study woredas in terms of traditional agroecological zonation and production seasons. As a result of recent changes in rainfall pattern, some of the farmers in Belg growing areas are attempting to grow during the Meher season. For example in Temu areas of Legambo woreda, farmers have started growing crops during Meher season. In the past these areas were known as typical Belg growing areas.

Table 3: Key Data Contents of Household Survey Rounds, May/June, 2000 - June, 2002

Survey round	Time of survey	Key contents of the data set	Remarks
One	May/June 2000 (1992, Eth. cal)	Baseline inventory data: demographic, assets, land tenure history and landholdings.	The survey focused on inventorying the status at Mid-May 2000. Low food status period
Two	Nov./Dec. 2000 (1993, Eth. cal)	2000 (Eth.1992/93) Belg land use data and 2000 Meher land use and production data (household, agent and parcel data sets)	The data is for the period between Mid-May 2000 and Mid December 2000. Belg production failed.
Three	June 2001 (1993 Eth. cal)	2001 (Eth. 1993):Jan –June 2001 non-production data	The data is for the period between mid- December 2000 and mid-June 2001. 2000 Belg and Meher parcel data and 2000 Meher production data are collected. Poor food status period
Four	October/Nov 2001 (1994, Eth. cal.)	2001 (Eth. 1993/94) Belg land and Belg production data (complete set)	The Data is for the period between Mid-June 2001and Mid October 2001.The 2001 Meher land parcel use data is filled into round five. Better food status period
Five	March, 2002 (1994 Eth. cal.)	2001 (Eth. 1993/94) Meher land and production data (agent, household and parcel) (complete set)	The data is for the period between Mid-October 2001 and Mid-March 2002. The 2001 Meher land use and production data is made complete by bringing data from round four and farmer-corrected land transaction collected during the sixth round. The period is of better food status
Six	June, 2002 (1994 Eth. cal.)	Inventory data: demographic, assets, land tenure and holdings (non-production data).	The data is for the period between Mid- March 2002 and Mid-June 2002. The first round questionnaire with minor modifications is employed in the survey. The survey also captures demographic, assets and other changes since the fifth round. Period of declining food status

Bati, as indicated in the same table, is a low-lying area with high temperature and Meher production season. Dessie-Zuria woreda shares both Woinadega and Dega characteristics and farmers in Tebasit area of the woreda grow during Belg, while those in Gerado area grow during Meher and Belg seasons. Jamma is a typical Dega and Meher growing area. Most of the area in Jamma is plain and has

vertic soils. Except for a frost problem, the area is known to have potentially good agricultural potential.

Table 4: Altitude, Agroecological Zone and Production Seasons of the Study Sites

Woreda/PA	Mean altitude, meters	Agroecological zone	Production Season
Legambo woreda		Dega/Wurch	Mainly Belg
- Temu	3481	Dega/Wurch	Belg
- TachAkesta	3149	Dega	Meher and Belg
Dessie-Zuria woreda		Woinadega/Dega	Meher and Belg
- Tebasit	3182	Dega	Belg
- Gerado	2333	Woinadega	Belg and Meher
Bati woreda		Kola	Meher
- Chachato	1386	Kola	Meher
- Kamme	1757	Kola	Meher
Jamma woreda		Dega	Meher
- TulluMojo	2679	Dega	Meher
- Yedo	2679	Dega	Meher

Note: The altitude of each PA or site is determined by taking the average altitude of the location of each sample household measured using GPS instrument.

II. From Poor to Poor: Cycles of Poverty and Drought Recovery in South Wollo, Amhara Region, Ethiopia[3]

Peter D. Little, University of Kentucky

In high-risk environments of the Horn of Africa rural communities usually either are coping with drought and other disasters or recovering from them. In the past three decades their livelihoods have been marked by distinct cycles of "bust and boom" and at any given point in this period were confronting a 'shock' or trying to rebuild from one. This cyclical pattern is normal in drought-prone areas like those in many parts of Ethiopia. What is not usual, however, are the shortened length of time between periods of shock (bust) in rural Ethiopia and the extent (depth) of losses in social and economic terms with increased impoverishment and vulnerability after each successive disaster. This presentation summarizes preliminary findings from the BASIS/IDR interdisciplinary research program in the South Wollo and Oromiya Zones (collectively referred to as "South Wollo") of Ethiopia, with a focus on the recovery period (see Little 2002). It covers research from the early stages of recovery after 1999 drought up to the period when the next food security crisis struck (mid-2002). It shows how asset recovery—in this case, focused only on livestock—is quite spectacular in terms of monthly and annual growth rates, but still remains below levels of economic viability for the majority of households.

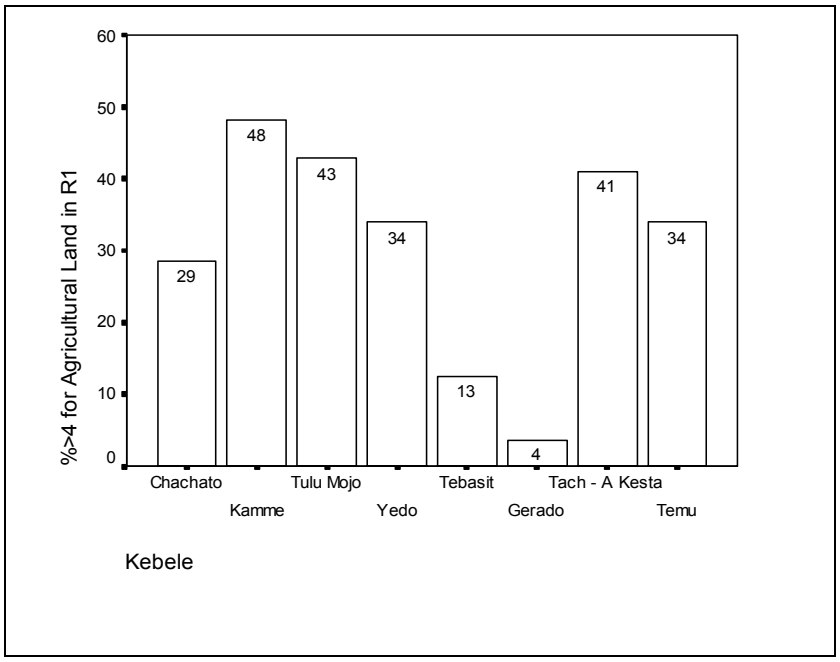
1. Viability and Vulnerability

Ideally a rural household in South Wollo should possess at least 1 to 1.5 hectares of land and two oxen to produce sufficient food and income to cover minimum subsistence requirements. With average yields of about 700 kg of grain (wheat/teff/barley mix) per hectare in 'normal' years, a family of five or 3.5 Adult Units can barely maintain subsistence and a minimal cash income for household needs with 1.5 hectares. Since yields frequently are reduced due to several factors, including low and poorly timed rainfall, poor soils, pests, and frost (at higher elevations), landholdings up to two hectares are more realistic thresholds for minimal food production viability. In a plow culture like that of highland Ethiopia, two oxen are required to cultivate without resorting to renting, borrowing, sharing, or, in many cases, pursuing a sharecropping arrangement that can greatly reduce the amount of grain controlled by the farmer. Different modes of sharecropping, which often are resorted to by oxen-less land holders, can mean payouts to the oxen owner of 50 percent of the total harvest.

In reality the bulk of rural households have considerably less than the two hectare minimum and most cultivate less than one hectare of land annually. Figure 1 shows that in all eight Peasant Associations (kebeles) where household data have been collected the majority of households cultivate less than one hectare of land, and in two cases (Tebasit and Gerado) less than 15 percent of households cultivate one or more hectares of land. In examining oxen ownership, the situation is not much better even when considering a low threshold of one oxen (see Figure 2). In June 2000 only 43 percent owned at least one oxen and 57 percent owned no oxen (only 16 percent of total households owned 2+ oxen). Not surprisingly, a very high percentage (>70 percent) of households received at least some food-aid during June 2000 to June

[3] The author would like to thank Tewodag Mogues of the University of Wisconsin and Eric Silver of the University of Kentucky for their valuable help in constructing some of these graphs and tables and in doing substantial data analyses. Assistance in research design and data collection also were ably provided by Yigremew Adal, Workneh Negatu, and Mesfin Tedesse of IDR , and the author is equally appreciative of their support.

Figure 1. Percentage of Households With One Hectare (4 timads) of Cultivated Land (June 2000)[1]



Notes: The author acknowledges the assistance of Eric Silver in constructing this table.

(1) About 15 percent share-crops 'in-land; and a larger percentage share-crops 'out land.'

2001, either direct transfers or food-for-work (>75 percent in 7 out of 8 kebeles), while a smaller proportion pursued petty trade and self-employment (34 percent of total) or waged employment (less than 15 percent) to survive.

Thus, overall average land and livestock holdings are minuscule in the project area (0.81 hectare and 2.69 TLU[4] per household of approximately five members in June 2000), waged and unwaged employment largely is limited to unskilled and low-paying positions, literacy rates are low (less 25 percent in most of the kebeles), and other assets (housing) and savings are extremely meager. For example, only 2 out of 448 households have bank accounts and not much than this keep cash savings at home, while food stocks and stores rarely keep more than a few months of cereal requirements on hand. A relatively small perturbation in rainfall, such as a 30 percent decline in rainfall, with a corresponding decrease in crop yields, can throw large segments of the community into a crisis, forcing many to deplete their few assets to buy food. The precarious existence for the majority of households in South Wollo means that only the slightest deviations in the norm can result in severe food security problems and rapid asset de-accumulation as witnessed most recently in 2003. For the better-off households (up to 20 percent of households in some kebeles) and traders who can absorb a degree of risk, these emergencies create

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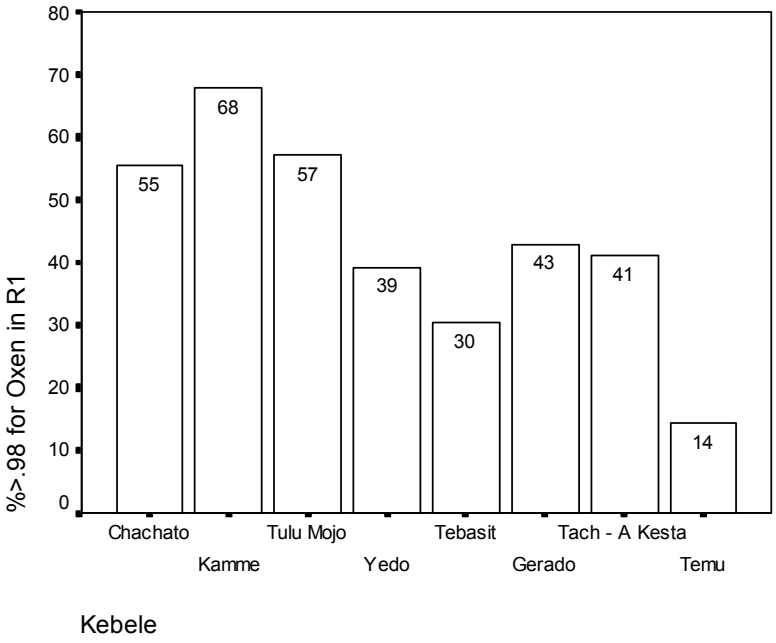
[4] As used here, a TLU (Tropical Livestock Unit) is:
1.0 TLU=1 head of cattle (oxen, bull, cow, calf, heifer)
0.5 TLU=1 Horse/Donkey/Mule
1.4 TLU=1 camel
0.1 TLU=1 sheep/goat
Although chickens are owned by households, they are not included in the calculations.

Figure 2. Percentage of Households with 1+ Oxen (June 2000)[1]



Notes: The author acknowledges the assistance of Eric Silver in constructing this table.
(1) 57 percent have no oxen; 16 percent own 2+ oxen.

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opportunities to accumulate devalued assets like livestock.

2. Recovery Cycle

The drought of 1999, along with the poor harvests of late 1998 (June-October), resulted in an estimated 40 percent reduction in average livestock holdings.[5] Livestock serve multiple functions, including traction for agriculture (oxen and equines), but most importantly they represent savings and assets that can be liquidated during downturns or reap annual increments of 15 percent or more in good years. While herds remain relatively small in South Wollo, relatively rapid increases in herd recovery have increased since the end of the drought. For example, during June 2000 to December 2001 alone large gains were made in herd recovery in virtually all of the study kebeles, with the exception of Kamme and Yedo, while the overall increase across all sites was an amazing 40.5 percent (see Figure 3 and Table 1). Both male- and female-headed households increased, with the latter actually growing faster although their average herd sizes remain considerably below those of males (see Figure 4) During the recovery period rates of growth were not uniform for all species of livestock nor were monthly

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[5] Efforts are currently underway in the field to track pre-1999 livestock holdings in the study region. In the absence of these data, survey data in the area from March-April 1998 (see IDR/SIDA 1999) are used to calculate pre-drought livestock holdings. To make these data comparable to our current data, we had to use a 1.3 multiplier to account for the fact that our information includes herd holdings from Oromiya Zone (Chachato and Kamme), which on average are 30 percent greater than herd sizes in South Wollo. Since our first round of observation (June 2000) took place approximately six months after the recovery had begun, I adjusted the June 2000 downward by 6.4 percent, the growth rate between June and December 2000, to estimate herd holdings in December 2000 when herd recovery began. Thus, it is estimated that average herd sizes were at a maximum average of 4.25 TLU prior to the drought and were reduced to an average of 2.56 in the study region at its lowest point. Of course, these averages mask the considerable variation in reductions that occurred in the area, with some households losing more than 80 percent of livestock asset and others losing relatively little.

Figure 3. Recovery in Animal Assets, June 2000 to December 2001

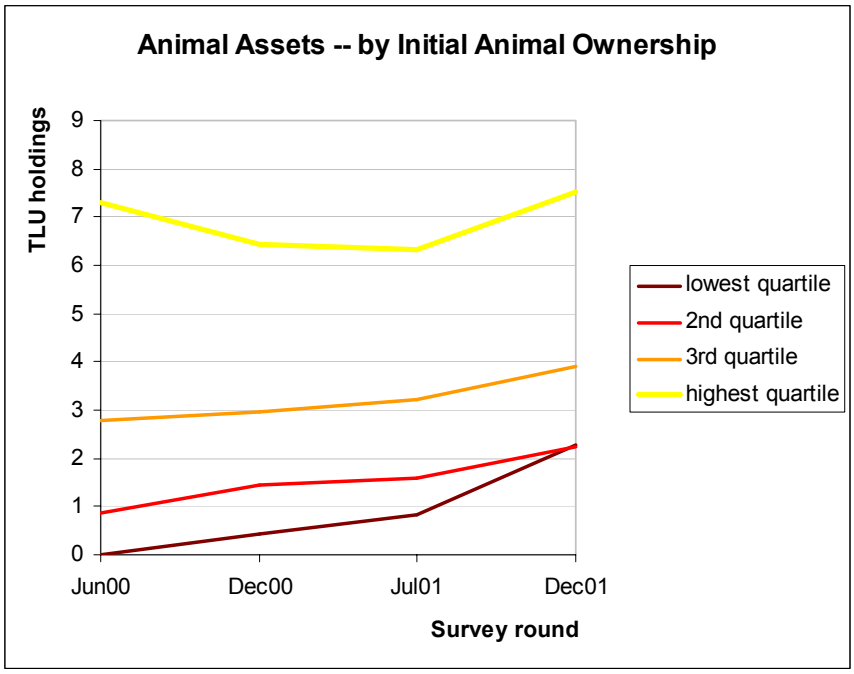


Table 1. Herd Increase/Decrease by Kebele (June 2000-December 2001)

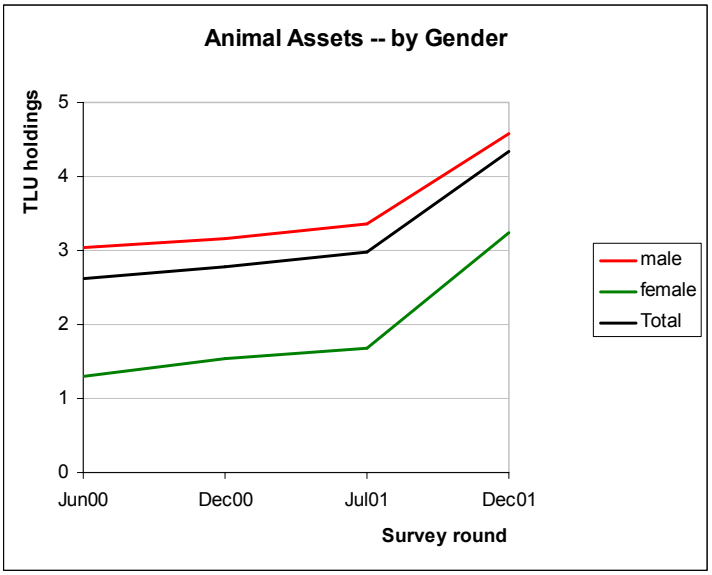
KEBELE	TLU[1] INCREASE
Chachato	+25.8 %
Kamme	-13.0 %
Tulu Mojo	+32.0 %
Yedo	NC (no change)
Tebasit	+50.0 %
Gerardo	+50.0 %
Tach Akesta	+88.9 %
Temu	+200.0 %

Notes:

1. See footnote (2) in paper for definition of Tropical Livestock Unit (TLU).

increases the same. The monthly increase in TLUs was four percent during the first part of the post-drought period (June 2000 to June 2001) but grew seven percent during July 2001 to March 2002. Moreover, the first part of the recovery period was characterized by rapid growth in sheep and goat flocks, mainly because small stock flocks grow very quickly (increases of 40 percent per annum are not unheard of under favorable conditions), and much less significant increases in cattle numbers (especially oxen). Later in the recovery cycle farmers often transfer their small stock assets into cattle, a pattern that is observed in the South Wollo data.

Figure 4. Herd Growth by Gender of Household Head (June 2000-December 2001)



Notes: The author acknowledges the assistance of Teowdaj Mogues in constructing this graph.

Strategies of recovery vary considerably among different strata of households—rich,[6] middle, poor, and very poor—with the poorest frequently taking in sheep on a 'share-herd' basis, where they share in animal products and off springs with the owners. Better-off farmers rely on breeding and selective livestock purchases to rebuild and many also sell off high-priced oxen during the initial phases of recovery and buy small stock. Later on they convert their small stock holdings into cattle and can reap considerable profits from this. During the one-year period of July 2000 to December 2001 prices for oxen alone increased 23 percent, a normal price pattern in drought-affected regions when cattle herds are reduced (see Little 1992; 2003). Wealthier cattle owners were able to take advantage of these market opportunities. If one looks at the means of herd recovery during June 2000 to December 2001, breeding (natural reproduction) is the overwhelming mechanism followed by market purchases and borrowing. Borrowing or customary stock loans represent a small part of the herd growth, which is not surprising given levels of poverty in the area and the amount of social change that has taken place and weakened local institutions of reciprocity and aid.

Is herd recovery associated with certain external and internal economic and social factors? At this point the data are too aggregated and unrefined to really tease out statistically significant relationships. These kinds of regressions and other analyses will be done in subsequent months and will take account of the considerable agro-ecological, economic and other differences across the 8 kebele sites. Nonetheless, some intuitive insights can be made relying on descriptive statistics and addressing three obvious issues that might be important for recovery. These are: (a) non-farm activities (waged and self-employment); (b) food aid; and (c) agriculture.[7] Very brief and inconclusive summaries of each of these are presented below.

Non-Farm Activities and Market Access: It should be noted that non-farm activities, including migration for waged employment and self-employment (often petty trade) is strongly concentrated in the two kebeles (Kamme and Chachato) of Bati district (wereda). These are two of the three wealthiest livestock sites in the study region, but both showed fairly low rates of recovery. However, it is important to note that each of these weathered the drought much better than other sites, because non-farm income was available to offset the need to deplete animal assets to buy food. This clearly helped households to hold on to animal assets during the drought even though its role in

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[6] The term 'rich' is used in a relative, since even 'rich' South Wollo farmers can be poor in absolute terms.
[7] Credit is another obvious variable that could be addressed, but preliminary analyses show that is likely to be insignificant.

recovery may not be obvious. Interestingly, reliance on self-employed activities (for example, petty trade) decreased as the recovery period progressed, which implies that they are mainly used as a drought coping rather than recovery/investment strategies. Further analyses of this and other possible relationships is needed, but I suspect non-farm income will prove important in determining a household's capacity to hold on to livestock during drought (i.e., a coping strategy) but less important in determining differential herd recovery rates in post-drought years.

Access to non-farm income, particularly waged employment, closely correlates with distance to major market towns and other infrastructure, as does access to food aid and other services. Table 2 measures the extent of market isolation among the eight different research sites, while Table 3 examines the relationship between wealth

Table 2. Average Distance to Market, Roads, and Other Infrastructure (2000-2001) (measured in minutes)

Kebele/Location	Average Distance to Markets and other Infrastructure (minutes)	Range by Wealth Quartile*
Chachato	889	879-991
Kamme	587	461-633
Tulu Mojo	941	891-985
Yedo	1021	932-1098
Tebasit	1628	1556-1785
Gerardo	557	518-611
Tach-Akesta	1376	1235-1626
Temu	1437	1281-1481
TOTAL	1054	

Table 3. Average Distance to Market, Roads, and Other Infrastructure by Wealth Quartiles, 2000-2001

Wealth Quartile[1]	Mean Isolation (in minutes walking time)	Median	Standard Deviation
I (poorest)	1174	1140	555
II	1067	958	546
III	984	870	512
IV (wealthiest)	955	895	409
ALL (n=447)	1054	960	518

Notes: The author acknowledges the assistance of Eric Silver in constructing this table.

(1) There is a statistically significant relationship at .029 level between isolation and wealth (measured in livestock wealth).

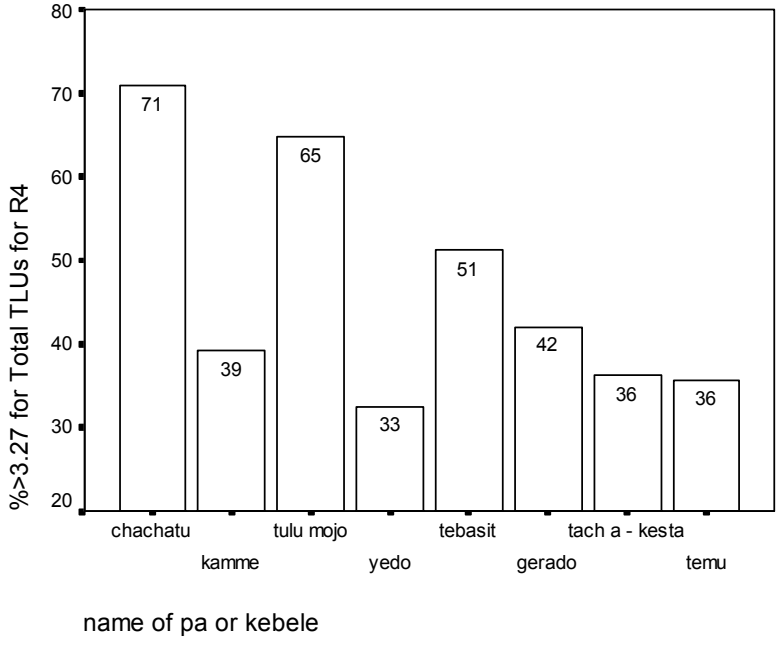
(measured in livestock ownership) and distance (measured in walking time [minutes]) to markets and other infrastructure (all weather roads, financial facilities, electricity and six other indicators). Statistical analyses and tests were conducted and not surprisingly a strong relationship was found between market/infrastructure proximity and wealth (significant at the .029 level).[8]

[8] Eric Silver conducted the statistical tests using the SPSS program

Food Aid: With the exception of the Jamma wereda sites (Tulu Mojo and Yedo) virtually all sites received substantial amounts of food aid during June 2000 and December 2001 (about 80 percent of this was concentrated in the June 2000-June 2001 period). The two sites that received the most food aid—Chachato and Kamme—had non-farm income sources, relatively good market access, and relatively low rates of herd growth but above average herd sizes; while those that received the lowest amounts of food aid also had relatively little herd recovery compared to other sites. Clearly, Tach Akesta and Temu where livestock holdings in June 2000 were low experienced very high growth rates and also received relatively large amounts of food aid. If we look at the effects that food aid had on herd growth by different wealth quartiles of households the evidence is equally mixed. Figure 5 shows that the poorest livestock quartile did receive considerable food aid and seems to have shown good herd growth, although they started in June 2000 at a very low point (i.e., average TLUs for the poorest quartile was '0' in June 2000). While important for the poorest households, food aid across all sites was considerably less important for households than food purchases. My intuition is that when site and wealth differences are factored food aid will not prove to be a statistically significant variable in explaining differences in herd/asset recovery rates, except perhaps among the very poorest households.

Agriculture: Agriculture did not begin to recover in the area until 2001 and the first good harvests were not until after the 2001 belg season (May-June) and 2001 meher season (November-January). While South Wollo is a chronically food insecure zone, grain sales are an important source of income for purchasing necessities, including livestock. If we examine total food sales during June 2000 to March 2002 they grew from 95 to 405 household transactions and the average amount of grain (especially wheat, teff, and barley) sold monthly per household more than doubled to about 27 kg per or an approximate value of 36 Ethiopian birr or US $4.20. The highest period of grain sales (July 2001 to March 2002) also correlated with the highest periods of

Figure 5. Percentage of Households Who Reached Livestock Assets > 3.27 TLU by December 2001



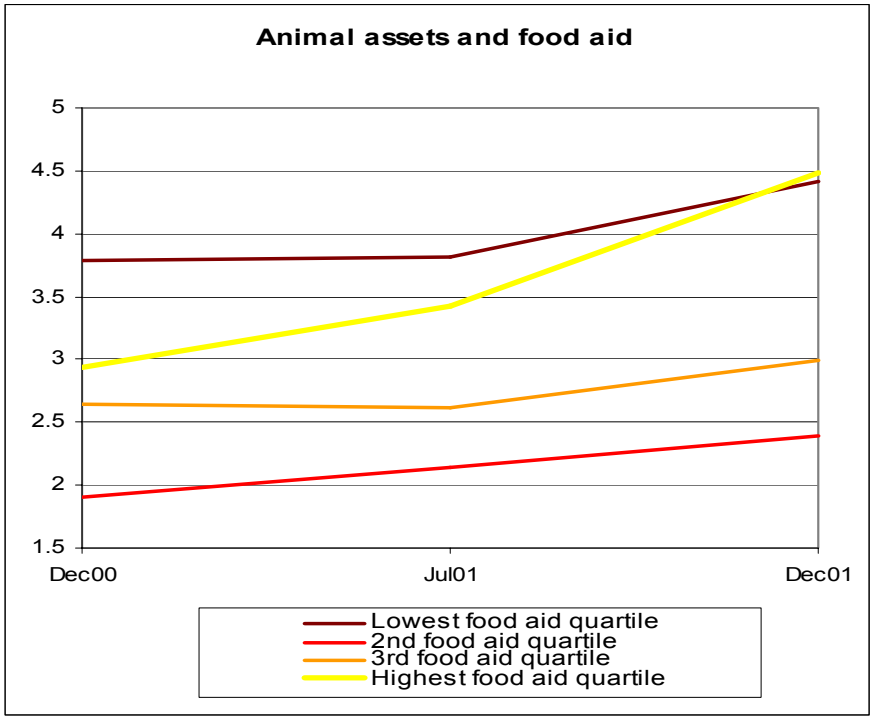
herd growth, but again caution is needed in interpreting these results. The two sites with the highest farm production and incomes—Tulu Mojo and Yedo—have higher than average livestock holdings but the growth of their recovery was lower than many other kebeles during June 2000 to March 2002.

3. Concluding Remarks

Empirical evidence has been presented that shows relatively good asset recovery rates for many households in South Wollo. While the presentation has glossed over the considerable heterogeneity in recovery strategies and experiences and relied on aggregated "averages," it does show that even in chronically food insecure and very poor areas households show considerable resiliency and innovation in recovering from devastating shocks. The next stages of this work will test the statistical significance of a number of variables in determining differential recovery rates, including those mentioned in the previous section.

Overall households have improved during the period June 2000 to December 2001. For example, the number of households in the poorest TLU quartile declined in almost all of the study sites, including the poorest (Tach Akesta) where the number of stockless households declined by more than 15 percent. However, most households (less than 30 percent of total) still have not recovered to pre-drought average holdings of 4.25 TLUs (see footnote 1). If we use a low figure of 3.27 TLU for average pre-drought holdings (which is the average excluding the Oromiya sites of Kamme and Chachato), one can see that in many sites considerably less than 50 percent of the households achieved this minimal level (see Figure 6). Regardless of impressive recovery rates, even those households who recovered to pre-drought herd levels remain poor and vulnerable to the next downturn. Even before the 1999 drought only approximately 28 percent of households owned two oxen, the requirement for plow agriculture, and a large percentage owned no oxen at all. By March 2002 households had recovered to the point that 22 percent owned 2+ oxen and the number of oxen-less had declined from 56 percent in June 2000 to 47 percent in March 2002. This pattern shows excellent trends but only moves them towards a pre-drought level that for most is still economically unviable and impoverished. With another drought devastating the area during the second half of 2002 and 2003, most households never achieved their pre-drought asset levels before they began to sell them off again.

Figure 6. Relationship between Food Aid and Herd Recovery Rates



4. References Cited:

Little, Peter D.
1992 Elusive Granary: Herder, Farmer, and State in Northern Kenya.
Cambridge, UK: Cambridge University Press.

2003 *Somalia: Economy Without State.* Oxford, UK: James Currey Publishers; Bloomington, IN: Indiana University Press.

Little, Peter D., with assistance from Abdel Ghaffar M. Ahmed, Michael Carter, Workneh Negatu, and Michael Roth
2002 *Building Assets for Sustainable Recovery and Food Security*. BASIS Brief, Number 5. Madison, WI: BASIS Research Program, Department of Agricultural and Applied Economics, University of Wisconsin-Madison.

III. Gender Dynamics and Household Drought Coping and Recovery Strategies in South Wollo and Oromiya Zones, Ethiopia

Priscilla Stone (Washington University)
and Peter Castro (University of Syracuse)

1. Background

- Within the general context of chronic food insecurity, 2003 has put some 11.3 million people in Ethiopia in acute need of food aid. Another three million are likely to face food shortages during the year, meaning the numbers at risk could rise to 14.3 million - one fifth of Ethiopia's total population. More than one-tenth of them reside in South Wollo Zone of Amhara Region
- Among this needy population, **female-headed households** are recognized as especially vulnerable, given social, cultural, and legal constraints in their access to, and use of, productive resources

2. Fieldwork in Summer 2002 and 2003

- This presentation is based on **qualitative interviews** with a subset of 40 households in the summer of 2002 drawn from the large-scale household survey undertaken by BASIS/IDR project. The purpose was to gather detailed and diachronic data on the differential experience of drought and recovery, especially among female-headed households. The work continues this summer, revisiting the same 40 households to determine the status of their coping/recovery strategies.
- Research sites reflected the **diverse characteristics** found in the wider BASIS/IDR survey: agro-ecological variation from lowlands to highlands, differential experience of major food insecurity episodes, differences in local livelihood strategies (especially regarding remittances, livestock, cropping systems, and trading), ethnicity (Amharic and Oromo), and residence (rural area versus urban/peri-urban locales)

Table 1: Comparison of Female-Headed to Male-Headed Households

	Female-Headed Hhs R 1(N= 108; 24%)	Male-Headed Hhs (N= 340; 76%)	Overall (N=448; 100%)
Household Income (birr) R2-4	385.85	506.83	477.60
Per Capita Income (birr) R2-4	38.80	49.80	47.05
Food grain Production (kg) (end of 2001)	82.81	164.6	144.15
Ending Grain Stocks (end of 2001) (kg)	47.09	81.48	72.88
Percent of Female Heads with Farm Size in bottom quartile (1.4 timad)	41.2	Not available	(average farm size 3.86 timad)
Livestock TLU (end of 2001)	2.67	4.37	4.02
Food aid (end of 2001) (kg)	70.88	82.17	79.35

- Households interviewed in Bati Woreda (Chachato and Kamme Kebele), Dessie Zuria Woreda (Tebasit and Gerado Kebele), and Legambo Woreda (Tach-Akesta and Temu Kebele).

Figure 1. Animal Assets by Gender

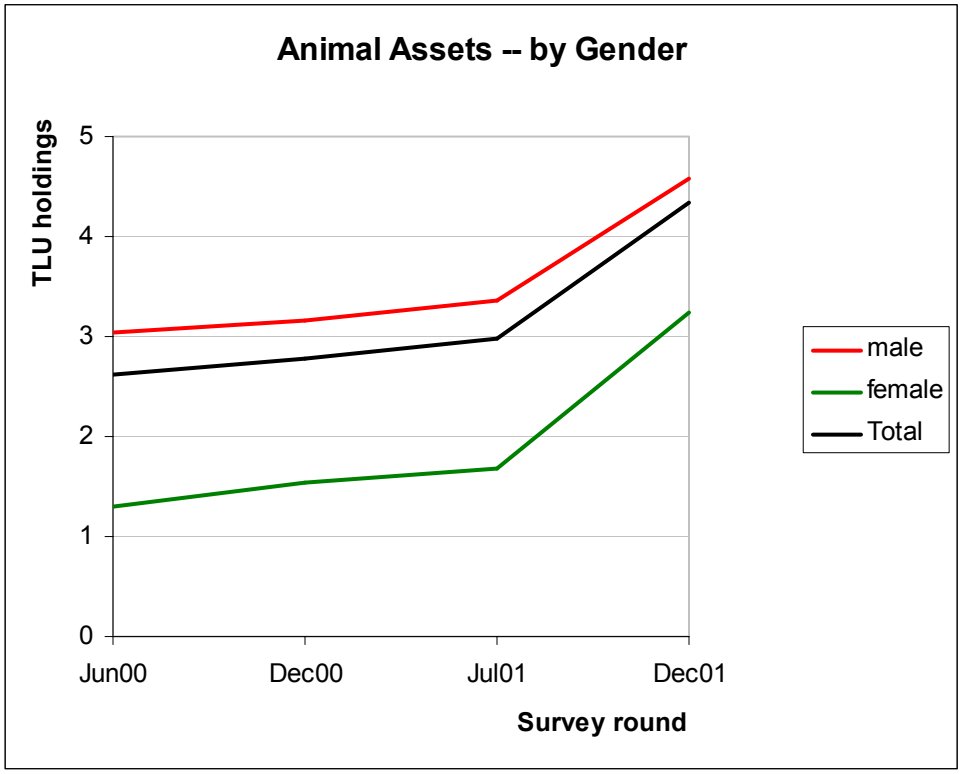


Table 2: Summary of Marital Histories

Pattern of Marital History	N
Married, each spouse only married once	7
Married, only married once but often separated	1
Wife married twice (divorced), husband married only once	3
Wife married twice, husband's data unclear	1
Wife married twice (widowed), husband married only once	1
Wife married thrice (divorced, widowed), husband married twice	1
Wife married twice, husband married twice (divorces)	2
Wife married twice, husband married thrice (divorces)	2
Husband married twice, wife's data unclear	1
Woman married thrice (divorced and twice widowed), now unmarried	1
Woman divorced once, now unmarried	1
Woman married twice (divorced, widowed), now unmarried	2
Woman married twice (divorced), now unmarried	1
Woman widowed once, now unmarried	3

3. Conclusions

The main conclusions to emerge from this field study are as follows:

1. Overall, female-headed households, as suggested by the literature, **own and earn less** than households headed by males, but they are not a homogeneous category in terms of livelihood or recovery strategies.

2. Households under the managerial control of women are usually associated with one or more of the following **characteristics**:
    - widows or divorcees who find remarriage undesirable or difficult because they have children from their previous marriage (or other liaison);
    - possess regular non-farm income from brewing or trading; and
    - live in a city, town or settlement (or a distant locale such as Addis Ababa or Djibouti).

3. The **status of female head of household** tends to be an impermanent and variable one. Marital histories indicated that people's lives were often marked by a number of transitions and events: separations, divorces, spouse's deaths, remarriages, or extra-marital sexual relations. During one or more times in a woman's life, she may face situations where she exercises a high degree of independence and self-sufficiency, only to have these diminish as a husband, adult offspring, or other kinsmen assumes the role of household head.

4. In examining the marital histories and **how these female headed emerge**, what is especially striking is how enormous variety in marriage and divorce patterns emerge from a nearly homogeneous starting point in terms of customary practice: marriages arranged by parents. Reasons for divorce are numerous: incompatibility (including in terms of household decision-making), lack of children, sickness, and martial infidelity were commonly cited.

5. The urban hierarchy within South Wollo and Oromiya – ranging from cities (Dessie, Kombolcha), to towns (such as Bati), to settlements (for example, Akesta) to emergent peri-urban sites (Chiro) – may possess important opportunities for **diversification** into income generation for women through small business (beverage selling, shops), trading, wage labor, rentals, and other means. With the continued growth of urban and peri-urban centers, these sites may become focal points for the emergence or the attraction of female-headed households.

6. Overall, the interviews suggested that the assumption that these rural households consisted of "centralized units under the control of a single individual" (cited from Fafchamps and Quisumbing, no date) might be too simplistic. While it may be true for some cases, other interviewees suggested that **household decision-making** might be based on more collaborative or consultative styles or show different spheres of authority for different purposes and at different times.

7. Women usually obtain their access to **land** through marriage, whereas men tend to acquire at least some land from their parents. But significant variations occur: women can also inherit land from their parents (they usually cite their fathers as provider of property), their siblings, or through redistribution.

8. Female heads of households engage in a variety of **plowing** arrangements (family aid, sharecropping, rental) with males, including both kin and non-kin. Sharecropping is less desirable than directly cultivating one's own land. Renting or having a male relative who can do the plowing and cultivation without requiring a specific share in the harvest is seen as much more favorable to the interests of the woman landowner.

Possible Policy Targets

- Female heads of household will likely be receptive to **non-farm or off-farm business** enterprise development programs, such as micro-credit for trading or small business development.

- Areas of **residential concentration** (cities, towns, small peri-urban sites) provide female heads many more income-generating opportunities beyond agriculture and more easily allow delivery of training and education.

- **Share-herding or purchase of small livestock** are livelihood strategies within the reach of households headed by women, aided by children herders, but constraints including shortage of pasture and animal feed.

- **Land use options** may grow as land increases in value with widespread shortage and fragmentation of holdings. This may improve the bargaining position of female heads of household who choose to sharecrop out their land due to lack of labor, or oxen for plowing. Agricultural extension aimed at educating these women in their options and opportunities for land use would be helpful

Remittances from wage-labor migration are clearly important to some of these female-headed households but they lack inform.

IV. Food Self-Sufficiency or Income Security? Managing Human and Physical Assets to Secure Livelihoods and Food Security in South Wollo, Ethiopia[9]

Michael Roth and Tewodaj Mogues [10]

1. Conceptual Framework

Issues of food insecurity, hunger and famine are the cumulative result of shortfalls in one or more sub-components that comprise the food balance equation (Eicher 1990):

$$(1)\quad C = (S^B - S^E) + Y + (G^R - G^G) + (F^B - F^L) + P - X + A$$

C = Grain Consumption (Food Security)	F = Food Lending (Borrowed, Lent)
S = Food Stocks (Beginning, Ending)	P = Food Purchases
Y = Production (Food Self-Sufficiency)	X = Food Sales
G = Food Gifts (Received–Given)[11]	A = Food Aid

Food production scientists (see for example Borlaug and Dowswell 1995) emphasize the importance of food technology adoption and production (Y) in securing access to food availability. Notwithstanding the importance of food production, others (including Reutlinger 1977, Sen 1981, and Sen 1990) draw attention to the role of entitlements (S, G, F, P, X, A) in securing food acquirements. Famine according to Sen is caused by various influences (drought, flood, inflation, lost employment, changes in relative prices, etc.) that deprive some people of entitlements to adequate food. Long-term policy must be geared to enhancing, securing, and guaranteeing these entitlements, rather than simply expanding food output. The contrast between these two livelihood strategies – food production versus non-farm income growth – motivates this analysis and hence the following decomposition of household survey data for empirical enquiry:

2. Drought Vulnerability

Bi-annual BASIS surveys (roughly June and December) were administered to a stratified random sample of 423 households covering eight *kebeles* in four *woredas*, and spanning seasonal rainfall and agroecology continuums (see Table 1). A general decline in rainfall throughout 1999 culminated in the absolute failure of the *Belg* season harvest in 2000. While the drought situation had improved in Batti and Jema by December 2000, severity of drought continued to be a serious concern in Tebasit, Tach-A Kesta and Temu. Relief from drought improved throughout 2001, indicated by fewer and fewer households reporting continuance of severe drought (all *kebeles*),

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[9] Paper prepared for the Workshop on Food Security in Eastern Amhara Region, held at the Papirus Hotel, Bahir Dar, 17-18 June 2003, organized by BASIS and the Institute of Development Research, Addis Ababa University.

[10] Michael Roth is senior researcher and Tewodaj Mogues is graduate research assistant with the Land Tenure Center and the Department of Agriculture and Applied Economics, University of Wisconsin-Madison, fax: 608-262-2141, email: <mjroth@facstaff.wisc.edu> and tmogues@students.wisc.edu.

[11] Includes food given as repayment for food previously borrowed.

Figure 1: Household Decomposition Matrix

		CASH INCOME SECURITY (CIS) (EXCLUDING FOOD FOR WORK INCOME)	
		Lower to Lower Middle	**Upper Middle to Upper**
FOOD SELF-SUFFICIIENCY (FSS)	Lower to Lower Middle	***Low FSS:Low CIS*** Low Relative Ability to Grow Sufficient Food *Low Relative Ability to Purchase Food*	**Low FSS:High CIS** *Low Relative Ability to Grow Sufficient Food* *High Relative Ability to Purchase Food*
	Upper Middle to Upper	***High FSS:Low CIS*** *High Relative Ability to Grow Sufficient Food* *Low Relative Ability to Purchase Food*	***High FSS:High CIS*** *High Relative Ability to Grow Sufficient Food* *High Relative Ability to Purchase Food*

Table 1: Seasonality, Agroecology and Drought Perceptions by Household Sampling Frame

	Batti		**Jema**		**Dessie Zuria**		**Legambo**	
	Chachat	Kamme	Tulu Mojo	Yedo	Tebasit	Gerado	Tach – A Kesta	Temu
No. Sample Households	N=56	N=54	n=54	N=52	N=47	n=54	n=54	N=52
Seasonality [a]	M	M	M	M	B	BM	BM	B
Agroecology (% h/holds):								
Wurch = Upper highland								100.0
Dega = Highland			100.0	71.2	100.0		100.0	
Woina Dega = Midland				28.8		100.0		
Kola = Lowland	100.0	100.0						
Severity of drought since last interview six-months earlier [b]								
Mehir (Dec) 2000	0	0	9.3	9.6	42.6	14.8	35.2	28.8
Severe/Mild	0	0	35.2	36.5	31.9	33.3	40.7	44.2
Belg (June) 2001	0	0	3.7	7.7	0	0	0	0
Severe/Mild	44.6	44.4	53.7	86.5	6.4	1.9	37.0	34.6
Mehir (Nov) 2001	0	0	0	0	2.1	0	0	0
Severe/Mild	14.3	20.4	33.3	57.7	21.3	20.4	0.0	5.8
Food Security Perceptions since last interview [c]								
Mehir (Dec) 2000	3.6	0	70.3	90.7	53.2	67.3	83.7	92.4
Belg (June) 2001	3.6	1.9	9.3	15.1	23.4	25.5	46.3	55.8

a. Seasonality: B=Belg (short season rains), M=Mehir (long season rains), BM = both Belg and Mehir.
b. Percent of households reporting having experienced severe (prolonged) or mild drought in the six month period prior to the interview.

c. Percent households ranking food security as "bad" or "extremely bad" since last interview six months earlier.

and for *kebeles* in Dessie Zuria and Legambo, a reduction of households reporting prolonged drought. Hence, data in Table 1 reflect wide inter- and intra-regional variation in household food security and drought vulnerability.

3. Food Entitlements

Measurements of food availability and food consumption based on principal commodity groups (grains, oilseeds and pulses) were obtained from survey data and converted into both standard weights (kilograms) and caloric equivalents (calories/adult/day). The importance of both food production and grain purchases (via cash income) to food security are clear from Table 2. Households with the least food entitlements (Low FSS, Low CIS) consume on average only 1,229 calories/adult/day, substantially below acceptable minimal nutritional requirements of 2,100 calories/adult/day.[12] Conversely, the highest levels of food security are achieved by those households with the most robust entitlement sets (High FSS, High CIS). While it is intuitive that own-production is key to food security, the data in table 2 indicates that grain purchases exceed own-production in importance for all food security strata except one – High FSS, Low CIS.

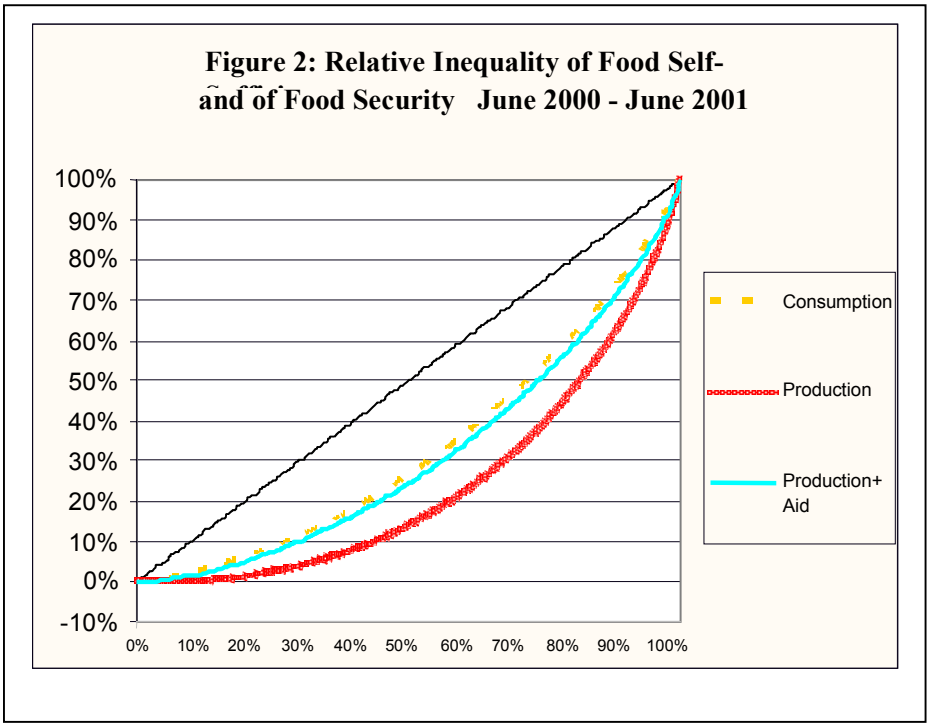
Table 2: Food Security Strata: Food Stock and Livestock Adjustments, 6/2000 – 6/2001

Food Security Strata:		*Low FSS: Low CIS*	*Low FSS: High CIS*	*High FSS: Low CIS*	*High FSS: High CIS*
Sample size	***No. of h'holds***	***N = 122***	***N = 90***	***N = 90***	***N = 121***
FS Status:					
Food self-sufficiency	***Kg produced***[a]	104.9	110.4	643.9	692.6
	Calories/adult/day[b]	285.8	305.3	1741.5	1887.5
Food security	***Kg consumed***[a]	447.3	767.7	826.6	1182.8
	Calories/adult/day[b]	1229.2	2124.5	2267.2	3283.7
H'hold cash income	***Birr***	8.6	412.1	15.2	492.9
Food Marketing and Transactions:					
Food purchases	***Calories/adult/day***	***627.9***	***1275.6***	***565.5***	***1187.1***
Food sales		***46.4***	***61.2***	***317.0***	***185.1***
Food gifts received		***25.4***	***27.7***	***17.3***	***20.0***
Food gifts sent		***5.5***	***29.1***	***13.2***	***69.6***
Food Aid					
Engaged in food for work	***% H'holds***	***65%***	***75%***	***38%***	***70%***
Food Aid Received[2]	***Mean Kg***	***272.3***	***144.07***	***127.73***	***206.06***

a. Total crop production or consumption per household.
b. Caloric equivalent of average household production/consumption (per adult per day) of all grains, pulses and oilseeds. While calorie conversion coefficients vary by commodity, roughly 100g = 350 calories.

It is clear from Table 2 that well-off households (High FSS,High CIS) secure their food availability with abundant entitlements derived from own-production and food purchases. It is also clear that

[12] Based on personal communications with Workneh Negatu, director, Institute of Rural Development, AAU.



households with the smallest entitlement set (Low FSS, Low CIS) achieve their rather minimal levels of food security through purchases. While food-giving to neighbors and kin is evident, it is significant only for well-off households. Receipt of gifts from neighbors and kin is important for all strata but is nonetheless a rather small contributor to food security. What is not clear is how poor households can afford grain purchases when their cash income is reportedly so small? Further data analysis will be undertaken to provide an answer to this question, but Priscilla Stone (personal communications), who has done case study work with a subset of the sample households [see also Stone and Castro in these proceedings] proposes one possibility – namely that households at this level engage in a complex of diverse petty trading activities characteristic of barter (in-kind) transactions.

Food aid receipts, whether obtained through outright grants or food for work programs, are also an important pathway to food security for all households, indeed for both the poor and the relatively well-to-do. As indicated in Figure 2, the aggregate effect of food aid is to equalize food availability, measured by food production plus food aid. However, while it could be rightly argued that all households in the South Wollo region are relatively poor and needy, food inequality and inadequate targeting of food aid is nonetheless evident, particularly for all households other than the High FSS - High CIS strata.

Despite the severity of drought that affected the Belg 2000 cropping season, our data show only minor dips in consumption that resulted in Belg growing areas (Dessie Zuria and Legambo), reflecting the effect of stock withdrawals, purchases, gifts and food aid (beyond production) on smoothing household consumption.[13] All *kebeles* other than those in Batti consume below or just slightly above the minimum food requirement threshold in the June 2000 – Dec 2001 period. The two *kebeles* in Batti *Woreda* – Chachato and Kamme – consistently exceeded the minimum food security threshold by a wide margin. Both are located near Kombolcha, a major industrial center, that affords reasonably good access to transportation infrastructure, and provides income diversification, reasonably good access to food aid distribution centers, and non-farm employment opportunity. In contrast, the two *kebeles* in Legambo – Tach-A Kesta and Temu – consistently fell short of minimum caloric requirements by a wide margin[14], a result of their dependency on Belg season rainfall, highland conditions (hence remote access), and prolonged severity of drought.

[13] The full effect of the Belg harvest collapse is not shown since households began to curtail grain consumption well in advance of the Belg season (as early as 1999 or early 2000) while the data collection on food balance flows reported here began only in December 2000.

[14] While it could be argued that consumption of grains, oilseeds and pulses (upon which these caloric curves are based) underestimate total consumption by excluding milk and tubers for example, it is estimated that former comprise in excess of 90% of total household consumption.

4. FSS Constraints

Beyond timely and sufficient rainfall, the ability to acquire sufficient food entitlements through own-production depends on access to resources, in particular land and oxen.[15] The results in Table 3 provide preliminary insights into how these two factors interact to constrain food production.

Our data depicts the level of inequality in land and livestock holdings (Tropical Livestock Units)[16], the two key assets held by rural households. As confirmed by a number of studies[17], total land holdings (including rentals and sharecropping) are relatively equally distributed; e.g the poorest 50% of households in terms of land holdings hold 30% of land assets, while the wealthiest 20% hold roughly 40%. Livestock resources however show a much higher degree of inequality; most noteworthy is the fact that the poorest 30% of households in terms of livestock holdings hold virtually no animal assets. In the event that land holdings and livestock are highly and positively collinear, small households that lack oxen, adequate labor or financial capital are conceivably better off renting/sharecropping-out their land rather than farming it themselves. Data in Table 3 showing low farm sizes for the majority of farms (1.87 to 7.29 timad, 0.5 to 1.8 ha), particularly for dry land farming conditions, the propensity of farms in the smallest two quartiles to lease-out land, and those in the two largest quartiles to lease-in land, lends credence to this hypothesis.

Table 3: Landlessness and Degrees of Access to Labor Exchange and Financial Capital According to Farm Size

Land holding quartiles	Units	Bottom	Lower Middle	Upper Middle	Upper	Overall Average
Sample Size		N=105	N=106	n=106	n=106	N=423
Household Attributes:						
Gender of h'hold head	% female	34.9	35.2	15.1	7.5	23.2
Total Livestock holdings	No. TLU	0.92	1.77	1.94	2.76	1.85
Total Household Cash Income	Birr	250.3	193.4	247.0	236.2	234.4
Landholdings:						
Total land size (incl. rentals & sharecropped)	Timad	1.87	3.29	4.59	7.29	4.32
	% hhs positive	93.2%	100.0%	100.0%	100.0%	97.6%
Land leased out or sharecropped out	Timad	1.79	2.32	2.99	3.64	2.48
	% hhs positive	32.0%	31.4%	22.6%	13.2%	24.6%
Land leased in or sharecropped in	Timad	1.29	1.75	2.20	2.70	2.40
	% hhs positive	5.8%	5.7%	14.2%	42.5%	17.0%

5. Determinants of Food Security

[15] As observed by Negatu at this conference, purchased inputs, in particular fertilizer, is applied in significant quantities by some farmers, but is rather modest in the aggregate.

[16] The Lorenz curve ranks the distribution of households ranked from smallest to largest with respect to the variable being measured, then plots the cumulative distribution of that variable in association with this ranking. Had each household held identical asset holdings, the distribution curve would be equivalent to a 45 degree diagonal line.

[17] See for instance data by the Central Statistical Authority (1995) which shows that 53% of all farming units (households) in South Wollo Zone are 1 hectare or less in size, 78% hold 2 hectares or less, and 98 percent hold 5 hectares or less.

Table 4: Multi-Variate Regression of Food Security Determinants

	Model I (Oxen)	Model II (Agro-ecology)	Model III (TLU)
Constant	167.0	276.5	152.9
Livestock ownership (TLUs)			41.8 **
Oxen ownership (dummy)	259.0 **	243.6 **	
Permanent land holdings (timat)	47.4 **	49.3 **	36.6 **
Gender of household (male = 1)	36.0	24.0	43.2
Age of household head (years)	-8.69	-11.8 *	-7.2
Household size (persons)	83.0 **	89.1 **	71.5 **
Food aid receipts (kg)	0.36 **	0.30 **	0.42 **
Chachato	550.7 **		430.7 **
Kamme	347.8 **		340.7 **
Tule Mojo	248.5 **		143.1
Yedo	292.4 **		288.9 **
Tebasit	172.4 **		88.3
Gerado	230.0 **		212.4 **
Tach-A-Kesta	-46.7		-26.5
Wurch (dummy)		-100.9	
Woina dega (dummy)		85.0	
Kolla (dummy)		288.0 **	
Off-farm income earnings	0.064 **	0.08 **	0.07 **
Distance to nearest main mkt	-0.86 **	0.17	-0.71 *
N	414	414	414
R^2	0.561	0.531	0.568

** = Significant at 5% level

* = Significant at 10% level

Ordinary least squares regression is used in Table 4 to identify determinants of food security. Aside from the inclusion of animal ownership (model I based on livestock ownership and Model III based on oxen ownership), Models I and III are otherwise identical. Model II substitutes dummy variables for agroecology for the regional dummy variables in Models I and II.

Consistent with theoretical expectations, ownerhship of land and animal assets is shown to have a strong positive effect on food security, as does food aid and off-farm income entitlements. Had land been a binding constraint to FSS, and had non-farm opportunities been lacking, household size would normally have a negative effect on food security. But, despite the small size of farms in South Wollo, labor nonetheless remains an important determinant of food security status through its productive deployment on off-farm income generation. Consistent with the earlier analysis for Batti, food security in Table 4 is shown to be positively associated with distance to nearest market, a result that is capturing the cummulative results of market access for inputs and trade, accessibility to food aid distribution centers, and non farm employment opportunities in Batti Woreda.

Surprisingly, household head characteristics (gender and age) either had no significant effect or a very weak effect on household food security. For the most food insecure households in Table 2 (Low FSS,Low CIS), these results suggest that that the disadvantage female-headed households have in terms of food security [see Stone and Castro in this proceedings] is mostly captured by the strong correlation that exists between gender of houehold head and size of land, assets, and income.

With the exception of Kolla, which as shown in Table 1 is highly correlated with the two survey *kebeles* in Batti *woreda*, agro-ecology did not have a significant effect. Location of household with respect to dependency on *Belg* rains also did not have the consistent negative influence on food security that was expected. Although the dummy variable for Tach-A Kesta *kebele* was negative it was statistically insignificant, while the two kebeles in Dessie Zuria (Tebasit and Gerado) are shown to have a positive and significant effect. Hence, despite the climatic shock associated with the failure of the *Belg* 2000 rains and harvest, the majority of households for the most part were able to secure adequate food entitlements through other mechanisms, including depletion of grain stocks, reallocation of labor to non-farm employment for food purchase, food gifts, and receipt of food aid.

However, in securing these entitlements, households in the period leading up to the Belg 2000 rains also engaged in disinvestment of other assets including livestock, tools, jewelry and even house materials (see Castro et al 1999, Roth and Little 1999) to enable food acquirements. The challenge

thus reaches beyond the issue of food insecurity to the bigger issue of poverty in South Wollo. For until asset levels of the majority of households can be increased substantially to allow them to weather climatic shock with greater margins to spare, households will remain vulnerable to a desperately poor quality of life, perhaps having enough food or wealth to make it through but never enough surplus to truly get ahead.

6. References

Borlaug, Norman E. and Christopher R. Dowswell. 1995. "Mobilising Science and Technology to Get Agriculture Moving in Africa." *Development Policy Review*, vol 13, pp. 115-29.

Castro, Peter, Yared Amare, Yigremew Adal, and Degafa Tolossa. 1999. "BASIS/IDR Community Assessments: Kebele Profiles, Parts I, II, III and IV." (December): 179 pages.

Eicher, Carl K. 1990. "Africa's Food Battles." In Carl Eicher and John Staatz, *Agricultural Development in the Third World*. Baltimore: The Johns Hopkins University Press, pp. 503-30.

Reutlinger, Shlomo. 1977. "Malnutrition: A Poverty or Food Problem?" *World Development* vol 5 (August), pp. 715-24.

Roth, Michael and Peter Little. 1999. Resource Access and Asset Management to Mitigate Food Insecurity: Methodology for Longitudinal Household and Community Studies. (September): 20 pages.

Sen, Amartya. 1981. *Poverty and Famines*. Oxford: Clarendon Press.

Sen, Amartya. 1990. "Food, Economics, and Entitlements." In Dreze, Jean and Amartya Sen. *The Political Economy of Hunger, Volume 1: Entitlement and Well-Being.* Oxford: Clarendon Press.

Stone, Priscilla and Peter Castro. "Gender Dynamics and Household Drought Coping and Recovery Strategies in South Wollo and Oromiya Zones, Ethiopia." Paper prepared for the Workshop on Food Security in Eastern Amhara Region held at the Papirus Hotel, Bahir Dar, 17-18 June 2003, organized by BASIS and the Institute of Development Research, Addis Ababa University.

The Federal Democratic Republic of Ethiopia, Central Statistical Authority. 1995. Agricultural Sample Survey, 1994/95 (1987 E.C.) Report on Land Utilisation (Private Peasant Holdings). Volume IV, Statistical Bulletin 132, Addis Ababa, October.

V. Agricultural Technology, Food Production, and Household Food Security in South Wollo and Oromia Zones of Amhara Region, Ethiopia: Summary

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1. Introduction

Both chronic and transitory food insecurity is severe in Ethiopia. Based on annual appeals for food aid, about 4.3 million of people in Ethiopia are affected by chronic food insecurity. Currently (2003), about 11 millions of Ethiopian people, mainly rural, are exposed to severe food crisis.

Food production plays a significant role in securing farm households food security by direct consumption or indirectly through generating cash income.

Food production in the last three decades, however, has not been sufficient enough to make rural population food secure. It was estimated that domestic food production provided in the late 1980s about 1,620 calories per person per day, while total availability, including imports, was about 1770 calories per person per day, which is 16 % below the minimal level (2100 calories per person per day, equivalent to 225 kg of grain per person per year) (FDRE, 1996). Cereals (the core of Ethiopian diet) production in Ethiopia has been steadily declining on per capita basis over more than 45 years (1951-1992). The production of cereals dropped from about 200 Kg per capita in the early 1950s to less than 150 Kg in 1992. The inadequate growth in production has led to increasing food scarcity, the gap between domestic production and consumption ranging between 1-2 million metric tons per year (FDRE, 1996).

2. Household Characteristics and Resources in the Study Woredas

Bati is found to have more than the average family size (5.34) compared to other woredas (Table 1). This would have effect on labor resource as well as on consumption. Seventy seven percent of the total households in all woredas are male-headed, the remaining being female headed (Table 1). Thus, female-headed households comprises a significant proportion farm households. Average age of household heads of male headed and female-headed households is found to be 47 years, indicating that the households in the study areas are relatively young. The non-literacy level in Bati (89.09 %) is the highest, while it is the least (70.59%) in Dessie-Zuria. While 83.06 % of the respondents are Muslims, the remaining 16.94 % of the respondents are Orthodox Christians (Table 1). Almost all the respondents of Jamma, Dessie-Zuria and Legambo woredas are of Amhara ethnic origin, while all respondents in Bati are of Oromo ethnic origin (Table 1).

Regarding educational level in terms of formal education, majority of the respondents (87 %) did not attend any formal education, while only 10.17 % of the respondent-heads attended some primary education (Table 2).

Table 3 shows the resource endowments of households in the study woredas. Bati woreda is highest in sizes land holding and livestock holding. On the other hand, subsistence pressure is the highest in Bati woreda. Legambo woreda is the least in landholding size and livestock size.

Table 1: Demographic and Socioeconomic characteristics of households in the study woredas in South Wollo and Oromia zones of Amhara region, Ethiopia

Attribute	Batti	Jamma	Dessie Zuria	Legambo	Total
Household size, mean	6.12 (2.32) N=110	5.21 (2.55) N=107	5.10 (2.00) N=102	4.91 (2.05) N=106	5.34 (2.09) N=4.25)
Gender of HH head:					
Male-headed HH	94 (85.5)	74 (69.2)	82 (80.4)	78 (73.6)	328 (77.2)
Female-headed HH	(16 (14.5)	33 (30.8)	20 (19.6)	28 (26.4)	97 (22.8)
Total	110 (100)	(107 (100)	102 (100)	106 (100)	(425 (100)
Head age					
Male head	46 (14)	48 (17)	48 (16)	46 (15)	
Female head	47 (12)	42 (19)	50 (16)	49 (12)	
Both	46 (13)	46 (18)	48 (16)	46 (14)	47 (15)
Head Literacy status:	98 (89.09)	79 (73.83)	72 (70.59)	79 (75.96)	328 (77.54)
Non-literate	12 (10.91)	28 (26.17)	30 (29.41)	25 (24..04)	95 (22.46)
Literate	110 (100)	107 (100)	102 (100)	104 (100)	423 (100)
Total					
Head 's religion					
Christianity	0	58 (54.21)	1 (0.99)	9 (8.57)	68 (16.04)
(orthodox)	110 (100)	49 (45.79)	100 (99.01)	97 (91.43)	356 (83.96)
Muslim	110	107 (100)	101	105 (100)	424 (100)
Total					
Head ethnicity					
Amhara	0 (0.00)	107 (100)	101 (100.0)	106 (100)	314 (74.06)
Oromo	109 (99.09)	0 (0.00)	0	0 (0.00)	109 (25.70)
Afar	1 (0.91)	0 (0.00)	0	0 (0.00)	1 (0.24)
Total	110 (100)	107 (100)	101 (100)	106 (100)	424 (100)

Note: Figures in parentheses are percents for discrete variables and standard deviation for continuous variables; N= number of responding households

Table 2: Educational Level of Household Heads in four woredas of South Wollo, June 2001

Education level	Batti	Jamma	Dessie Zuria	Legambo	Total
Never Attended	108 (98.18)	88 (82.24)	84 (82.35)	88 (84.62)	368 (87.00)
Never Attended	108 (98.18)	88 (82.24)	84 (82.35)	88 (84.62)	368 (87.00)
Primary Level	2 (1.82)	17 (15.89)	13 (12.75)	11 (10.58)	43 (10.17)
Primary Level	2 (1.82)	17 (15.89)	13 (12.75)	11 (10.58)	43 (10.17)
Junior Secondary	0 (0.00)	0 (0.00)	3 (2.94)	2 (1.92)	5 (1.18)
Junior Secondary	0 (0.00)	0 (0.00)	3 (2.94)	2 (1.92)	5 (1.18)
Secondary Level	0 (0.00)	2 (1.87)	2 (1.96)	3(2.88)	7 (1.66)
Secondary Level	0 (0.00)	2 (1.87)	2 (1.96)	3(2.88)	7 (1.66)
Total	110 (100)	107 (100)	102 (100)	104 (100)	423 (100)

Table 3: Major asset endowments of households in the study woredas, Amhara Region

Asset	Batti	Jamma	Dessie-Zuria	Legambo	Total
Land owned, ha	1.09 (0.490) N=107	0.98 (0.426) N=100	1.05 (0.581) N=(0.580)	0.84 (0.325) N=103	0.99 (0.472) N=408
Subsistence pressure*	4.92 (3.215) N=110	4.13 (2.438) N=107	4.89(3.000) N=102	4.73 (2.213) N=106	4.67 (3.045) N=425
Livestock, TLU	4.03 (4.01) N=103	3.44 (3.876) N=94	2.31 (1.679) N=	2.01 (1.680) N=85	3.00 (3.181) N=375
Oxen owned, Number	1.51 (0.626) N=73	1.59 (0.848) N=56	1.33 (0.516) N=51	1.37 (0.489) N=33	1.47 (0.655) N=213

* Subsistence pressure is household size in adult-equivalent per hectare of land holding

3. Sources of food

Farm households get their food from different sources. The common food sources identified in the study woredas are own production, purchases, food aid, food gift from relatives, friends and neighbors, loans from other households and from carry-over food stocks in their stores. The size of the contribution of each source to the household food availability varies from household to household and from area to area (Table 4). In all the four woredas, food production has been found to contribute the largest (57%) proportion to household food availability, followed by food purchases (22.27%). The least contribution was made by food gift (0.62%).

Own production

In terms of the quantity of food grain supplied to the total household food availability, own production is found to contribute the highest (57.00 %) proportion in all woredas. Own food production provided the highest contribution in Jamma woreda (86.37 %), the least being in Legambo woreda (35.16 %), with participation rate of 100 % and 80.95 %, respectively.

Food purchase

Food purchasing is an important source of food almost in all study woredas. The highest contribution by purchase was reported in Legambo woreda (39.68%) followed by Bati woreda (29.37%), the least being in Jamma woreda (11.17 %). The highest average quantity of food purchased (245.85 Kg.) per a household is reported in Batti, while the lowest (130.57 Kg.) is found in Jamma woreda, with participation rate of 96.4 % and 67.9 % respectively. This indicates that households in Batti seem to have better access to cash. This could be associated with remittance size, cash crops and non-farm activities, which are commonly better in Batti area.

Carry-over food stock in stores

Bati farmers were found to have the highest carry-over food stock (212.06 Kg) which contributes 19.90 % of food grain availability at mid-Decemeber 2000. Bati is followed by households in Dessie-Zuria (87.76 Kg.), contributing 14.75 %.of the total food grain availability. More over the highest proportion (100 %) of the households in Dessie-Zuria store food, while the least proportion (17.9 %) of households in Jamma stored food stocks. The least amount of stored food (carry-over) is reported by households in Legambo (45.38 Kg.), implying that Legambo is more vulnerable to food shortage than the other woredas.

Food Aid

Food aid contributes 7.94 %. of the food availability at the level of all woredas. The highest contribution (17.14%) of food aid to total food access is reported in Dessie-Zuria woreda, followed by that in Legambo (13.77%). The highest amount food aid per household (146.48 Kg.) is given to households in Dessie–Zuria followed by households in Legambo (109.56 Kg.). The least amount of food aid was offered to households in Jamma (73.33 Kg.). The number of households who participated in food aid is the least in Jamma (5.7 %), while the highest being in Bati (75.5 %).

Food gift

The contribution of food gift to total food availability/access is low in all woredas (0.62%). Food gift received by an average household in Jamma is the highest (72.50 Kg.), followed by a household in Bati (60.40 Kg.), the least being in Dessie-Zuria (39 Kg.). The number of participants in food gift however is generally very small. The highest participation is reported in Legambo (13.3 %), the least being in Dessie-Zuria (3.9 %).

Thus, own production capacity and purchasing capacity are the two most important determinants of food consumption security. Own production, the highest contributor to household food availability/access, is also expected to raise the purchasing capacity of farmers through farm sales income.

4. Food Security Status of Households

In this study, households are considered food secure when the minimum food consumption is 225 Kg of cereal-equivalent food grains per adult-equivalent per annum or when the minimum food consumption per adult-equivalent is 2100 calories per day. In this case study, the food consumption per household was monitored for the period between Mid-December 2000 and Mid June 2001 (183 days).

Household food security (C) in this study is proxied by the total amount of consumption of food grains (cereals, pulses and oil seeds) measured in calories per adult-equivalent member of a household per day for duration the study period (183 days). The contribution of meat, vegetables and other food sources are generally insignificant in the farm households of the study areas.

Table 4: Sources and average quantity (Kg.) of food availability per household from each source for the period between Mid-December 2000 and Mid-June 2001

Food source	Bati	Jamma	Dessie-Zuria	Legambo	All woredas
Stored food stock	212.06 (241.27) N=102 19.90 %	64.53 (42.67) N=19 1.56 %	87.76 (99.55) N=102 14.75 %	45.38 (65.05) N=90 9.87 %	114.67 (168.05) N=313 12.17 %
Harvested own production	505.08 (370.52) N=106 49.25 %	685.34 (498.34) N=106 86.37 %	282.09)236.45) N=97 45.09 %	175.20 (168.53) N=83 35.16 %	428.87 (402.10) N=392 57.00 %
Food Aid	82.95 (59.41) N=83 6.33 %	73.33 (40.08) N=6 0.52 %	146.48 (108.20) N=71 17.14 %	109.56 (57.34) N=52 13.77 %	110.48 (82.83) N=212 7.94 %
Gift-in	60.40 (59.36) N=10 0.56 %	72.50 (86.01) N=6 0.52 %	39.00 (28.30) N=4 0.26 %	44.68 (29.86) N=14 1.51 %	53.54 (51.42) N=34 0.62 %
Purchase	245.88 (195.89) N=106 29.37 %	130.57 (126.29) N=72 11.17 %	150.19 (120.48) N=92 22.77 %	170.95 (221.38) N=96 39.68 %	179.49 (180.29) N=366 22.27 %

Source: Survey data

Note: N=number of households reporting; figures in parentheses are standard deviation; the percentage indicates the percentage of contribution of each source of food grain to the total food availability/access

The period (Mid-December 2000 - Mid June, 2001) was generally unfavorable for food production. The Belg crops failed because of failure of Belg rainfall. Also the Meher season production was not good. On average, the proportion of farm households who were food secure during this period was 32.5 %, the rest being food insecure in terms of food grain consumption. The food security status as measured by the amount of calories of food grains consumed per day per adult-equivalent could largely indicate the food position of each household (Table 5). In this period, the highest proportion of food secure households was reported in Batti (65.5 %), the least being in Jamma (6.5 %). Bati households are found to practice maximum food purchase as compared to other woredas. Jamma area, though endowed relatively with better agricultural conditions, in the study year it was hit by frost damaging the crops in the field very heavily. More over other sources of food is highly limited for farm households of Jamma This could explain the low food status in the area.

Table 5: Food consumption (calories.) per adult-equivalent per day for the Period between Mid-December 2000 and Mid-June-2001 in the study Woredas of South Wollo and Oromia zones of Amhara region, Ethiopia

Food Status	Measure	Batti	Jamma	Dessie-Zuria	Legambo	Group total
Food Insecure	Mean	1666.65	1081.63	1424.88	952.11	1187.39
	Std Deviation	318.61	461.73	389.77	481.38	503.60
	Valid N	38	100	58	91	287
	Percent	34.5	93.5	56.9	85.8	67.5
Food secure	Mean	3556.27	3682.10	2935.14	2988.81	3302.93
	Std Deviation	1768.69	2152.79	869.46	1001.99	1503.12
	Valid N	72	7	44	15	138
	Percent	65.5	6.5	43.1	14.2	32.5
Group Total	Mean	2903.49	1251.75	2076.36	1240.32	1874.32
	Std Deviation	1699.10	937.45	986.21	917.18	1372.87
	Valid N	110	107	102	106	425
	Percent	100.0	100.0	100.0	100.0	100.0

Note: Food secure household is a household whose food consumption rate is 2100 calories or more per adult-equivalent per day

5. Socioeconomic Factors, Resources, and Household Food Security

Table 6 shows that the size of land holding, cultivated land, off-farm cash income, farm cash income and livestock holding are important factors that are positively associated with food security status.

6. Use of Technological Inputs

Technological inputs are important factors to enhance crop productivity and soil fertility. Improved seeds of cereals are the common improved inputs for higher food crop productivity and production. In the study woredas, use of improved food crop seeds is the highest in Jamma woreda and the least being in Batti woreda in terms of both the quantity of seeds per household and number of farm households using the technology. Generally however, the proportion of farm households using improved seeds is very low, 13.61 % of the sample.

Chemical fertilizer is another important technology for improving crop productivity and soil fertility. The largest user of both fertilizer types (DAP and UREA) are farm households of Jamma, the least being Bati farmers both in terms of fertilizer quantity and number of farm households using the fertilizers. The average amount of chemical fertilizer (DAP and UREA) used by an average farm household in all study woredas is 100 kg. Manure is an important organic fetilizer recommended for improvement of soil fertility and soil organic matter. Bati farmers are found to use the highest amount (343.06 Kg) per household. Farm households of Legambo did not report use of any manure. This could be associated with the size of livestock holding and moisture situation which does not encourage use chemical fertilizer in case of Bati, thus influencing them to resort to use of manure.

No farmer in the study woredas used herbicides, implying that farmers weed their farms manually, if at all they weed. With regard to use of insecticides, only 58 farmers of Bati woreda reported that they applied insecticides provided to them by woreda office of agriculture to control critical insect infestation that happened in the area (Table 7). This practice seems an emergency action for an

Table 6: Association of socioeconomic variables and household food status in the study Woredas of South Wollo and Oromia zones of Amhara region, Ethiopia

Factor	Food Secure	Food Insecure	Statistical test
Age of household head	46.18 (15.82) N=138	46.94 (15.27 N=287	t-value=0.4725 Prob.0.6816
Land owned, ha.	1.09 0.537) N=133	0.939 (0.429) N=275	t-value=3.1021*** Prob.0.001
Land Quality Index for Own land	2.23 (0.438) N=133	2.17 (0.556) N=275	t-value=1.110 Prob.0.268
Land cultivated (Meher), ha.	1.01 (0.587) N=123	0.895 (0.511) N=221	t-value=2.028** Prob.0.0217
Off-farm cash income, Birr	1010.02 (2183.11) N=101	583.15 (1168.25) N=183	t-value=2.0241** Prob.0.022
Farm cash income, Birr	441.53 (554.40) N=135	319.57 (458.16) N=275	t-value=2.3596*** Prob.0.0094
Livestock, TLU	3.31 (2.828) N=128	2.84 (3.343) N=247	t-value=1.360 Prob.0.175
Oxen, number	1.48 (0.549) N=83	1.45 (0.717) N=213	t-value=0.304 Prob.0.761
Subsistence pressure (family size/land cultivated)	4.29 (2.657) N=138	4.85 (2.203) N=287	t-value=1.790 Prob.0.074*

Note: Figures in parentheses are standard deviations; N= number of observations (households); *** = 1 % prob. level: ** = 5 % prob. level; * =10 % prob. level

unusual incidence. Thus the common agricultural inputs applied by small proportion of farmers in the study areas are fertilizers and improved seeds. Generally, it is observed that there is a considerable variation in the amount of inputs used by the farm households in the study woredas, as indicated by the standard deviations recorded.

8. Household Food Production

The total food (cereals, pulses and oil seeds) production per household is found to contribute the largest proportion of household food availability for the consumption period extending from Mid-December 2000 to Mid June 2001. Other sources of food grain are carry-over food stock in stores, purchases, food aids and gifts from various sources. In order to utilize the potential of own food production as the major source of food security, it is of worth identifying and defining the role of different assets like land holding, oxen, human capital, agroecology and other factors.

Table 7: Use of technological inputs in the study woredas in South Wollo and Oromia zones of Amhara region, Ethiopia

Technological input	Batti woreda	Jamma woreda	Dessie-Zuria Woreda	Legambo woreda	All Woredas
Improved seed, Kg	6.80 (5.63) N=5	38.88 (16.02) N=24	23.32 (9.43) N=13	23.86 (12.81) N=7	29.33 (16.76) N=49
DAP-fertilizer, Kg	12.50 (0.00) N=2	62.06 (30.36) 74	18.48 (12.98) 23	30 (10.00) N=6	49.74 (32.57) N=105
UREA-fertilizer, Kg	12.50 (0.00) N=2	62.91 (30.64) N=73	18.50 (12.56) N=25	21.25 (5.86) N=6	49.14 (33.23) N=107
Manure, Kg	343.06 (330.50) N=30	175.00 (95.74) N=4	147.36 (100.14) N=11	- - -	280.29 (288.11) N=45
Herbicide	None	None	None	None	None
Insecticides, kg	0.16 (0.37) N=58	None	None	None	0.16 (0.37) N=58

Source: Survey data, 2000

Table 8: Association of technological inputs and resources with food production capacity in South Wollo and Oromia zones of Amhara region, Ethiopia

Factor	**Low**	**Lower middle**	**Upper middle**	**Upper**	**Total**
Improved Seeds (kg.)	0.00 (0.000) N=23	3.69 (11.514) N=23	1.69 (8.336) N=59	9.91 (19.076) N=70	4.94 (14.043) N=186
DAP fertilizer (kg.)	5.65 (15.323) N=23	6.62 (15.149) N=34	7.20 (16.177) N=59	41.25 (43.684) N=70	19.72 (33.916) N=186
Urea fertilizer (kg.)	5.65 (15.323) N=23	6.62 (15.149) N=34	7.20 (16.771) N=59	41.95 (44.234) N=70	19.99 (34.353) N=186
Manure (kg.)	32.61 (110.380) N=23	17.75 (62.592) N=34	74.37 (173.559) N=59	72.14 (238.904) N=70	58.02 (182.801) N=186
Off-farm Income Birr	806.47 (978.51) N=17	1268.59 (2638.74) N=23	624.73 (434.26) N=49	1130.97 (3115.68) N=36	913.71 (2059.99) N=125
Labor (adult equivalent)	2.06 (1.208) N=24	2.36 (1.298) N=34	3.08 (1.484) N=60	3.44 (1.315) N=71	2.96 (1.439) N=189
Labor (adult equivalent)	2.06 (1.208) N=24	2.36 (1.298) N=34	3.08 (1.484) N=60	3.44 (1.315) N=71	2.96 (1.439) N=189
Cultivated area during Meher, ha.	0.80 (0.369) N=15	0.92 (0.530) N=23	1.031 (0.427) N=52	1.34 (0.656) N=70	1.13 (0.579) N=160
Cultivated area during Meher, ha.	0.80 (0.369) N=15	0.92 (0.530) N=23	1.031 (0.427) N=52	1.34 (0.656) N=70	1.13 (0.579) N=160

Oxen Owned, number	1.33 (0.516) N=6	1.31 (0.630) N=13	1.44 (0.552) N=39	1.71 (0.872) N=59	1.56 (0.748) N=117
Livestock Asset, TLU	1.92 (1.343) N=17	2.35 (2.538) N=28	3.37 (3.164) N=59	5.50 (5.069) N=70	3.92 (4.084) N=174

(Table 8 cont.)

Note: off farm income = cash income from off-farm activity and unearned income; figures inparentheses are standard deviations; N= number of responding households

9. Factors of own production capacity

In order to identify important factors that are associated with own production capacity, households are categorized into quartiles of own production capacity groups. The analysis of variance (ANOVA) shows that the mean values of food grain produced by the quartile groups are significantly different. The four quartiles of food production capacity were examined in terms some major factors of production. As Table 8 shows use of DAP and UREA fertilizers, labor, off-farm cash income, cultivated land size, livestock size and oxen number are found to relate positively and linearly with production capacity. These factors are important in enhancing the production capacity of farm households.

10. Concluding Remarks

To conclude, policies need to recognize that food security and production is dependent on the size of cultivated land of a household, off-farm cash income, use of chemical fertilizer, and ownership and economic use of livestock. For those households where agriculture remains viable improved food security will depend heavily on oxen ownership and land size, while for unviable units with small farm sizes (0.3 hectare or less) improved access to labor markets and non-farm activities will be critical for improved food security.

VI. Factors affecting soil fertility management on small holder farms in sub-Saharan Africa: a case study of the highlands of northern Ethiopia[18]

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1. Introduction

It is increasingly clear that declining soil fertility problem is the principal constraining factor for raising and sustaining agriculture production in sub-Saharan Africa (SSA) (Sanchez *et al*. 1997; Larson and Frisvold 1996). Actually, Sanchez *et al*. (1997) classify the problem as the fundamental root cause of declining per capita food production in SSA, meaning that no matter how effectively other problems are solved, per capita food production will continue to decline unless the soil fertility problem is stopped or reversed.

The continuous decline in SSA's stock of soil nutrients is linked to soil fertility management practices that are not properly aligned to the conditions intensive or continuous cultivation under increasing population pressure. Increasing population, has led to shorter fallow periods leading to more cultivation of marginal lands as well as the clearing of forest or bush lands for agriculture. A major consequence has been increased soil erosion from cropland, resulting in loss of soil nutrients and organic matter and lower crop yields (Ehui *et al*. 1990). Similar conditions (associated with increasing population pressure) characterized Asia yet they were able to achieve dramatic increases in crop yields. The key impetus for the success of the green revolution in Asia was the high rates of adoption and use of inorganic fertilizers on irrigated lands in addition to the adoption of high yielding varieties of rice and wheat. In East Asia, for example, inorganic fertilizer consumption rose by more than 850% from 29 to 281 kilograms per hectare of arable land in 1965 and 1995, respectively; in SSA, on the other hand, inorganic fertilizer consumption remained very low, rising from 3 kilograms per hectare of arable land in 1965 to only 8 kilograms in 1995 (World Bank 2000).

The low adoption and consumption of inorganic fertilizers in SSA is due mostly to high cost relative to output prices, lack of access to credit and markets, lack of irrigation, subsistence agriculture, low variable returns, poor extension and delivery systems, and other policy deficiencies. As a result, organic sources of nutrients (e.g., manure, compost, legumes, and crop residues) are often proposed as alternatives to inorganic fertilizers (Reijntjes *et al*. 1992). However, many of the organic methods (e.g., manuring, composting, and ploughing in crop residues) are recycling methods and can at best only act as a buffer to the system, but not redress the problem of nutrient depletion unless combined with use of inorganic fertilizers (Palm *et al*. 1997). In addition, they can be very costly when used alone due to the low concentration of nutrients, especially phosphorus (ibid; Larson and Frisvold 1996). Planting legumes (either for food or feed), which has the potential of restoring soil fertility within a shorter period through nitrogen fixation, is in most cases not effective because of short rotation cycles or planting species that concentrate the nitrogen in the pods (which are harvested for consumption) and add little to the soil (Giller and Cadisch 1995). The constraints associated with using organic or inorganic sources of nutrients alone suggest that combining the two sources may be the successful way for restoring and increasing soil fertility and soil organic matter, hence increasing yields in SSA. Models of nutrient cycling and evidence on the beneficial effects of combined use of organic and inorganic sources of nutrients support this view (Palm *et al*. 1997; Woomer and Swift

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1994).

Although good technical information is available about the benefits of combining organic and inorganic fertilizers, there is limited knowledge of actual farmers' integrated soil fertility management practices and the factors that influence their choices. Often, therefore, technical recommendations are made without taking into account the socio-economic characteristics that actually influence farmers' soil fertility management decisions. For example, farmers' perceptions and attitudes towards soil fertility can have a major bearing on the management of soil fertility. Although farmers are often more acutely aware of the condition of their land than is sometimes assumed by experts, they may not be fully aware of soil degradation, its causes, or consequences (Ervin and Ervin 1982). This is because soil degradation is a slow process and may be almost invisible. Smaling *et al*. (1996 and 1997) claim that soils have a large buffering store of nutrients to keep production going for several years and so farmers may not observe declining soil fertility, especially within a relatively short period of time. Knowing the socio-economic and policy factors that affect management of soil fertility problems will help target separate recommendations to households that are likely to adopt improved soil fertility management strategies and those that are not in the effort to improve the situation among all farm households.

2. Data Analysis

Using household and plot level data on smallholder farms from the highlands of Amhara region of northern Ethiopia, this paper develops a model, based on relationships among farmers' perception of soil fertility problem, socio-economic characteristics and production choices, farm conditions and natural factors, to examine the relationship between use of inorganic and organic sources of nutrients. The data are from 434 household and 1422 plot level surveys that were conducted in the highland areas (above 1500 meters above sea level) of the Amhara region in 2000 and 2001, following a stratification of the region based upon indicators of agricultural potential (whether the district is drought-prone or non drought-prone, as classified by the Ethiopian Disaster Prevention and Preparedness Commission)[19], market access (access or no access to an all-weather road) and population density (1994 rural population density greater than or less than 100 persons per sq km). Information was collected on farmers' perception of soil fertility problem, use of various soil fertility management practices, and other related data since 1991, when the current government came to power and launched the agricultural development-led industrialization (ADLI) strategy. The data were supplemented by secondary information on geo-referenced maps of the boundaries of peasant associations and geographic attributes, including elevation and climate.

Descriptive analysis of the data shows that farmers believe soil fertility of their plots had declined slightly between 1991 and 1999 (Figure 1). Farmers revealed that fertility had declined on 26% of the plots, while it had not changed on 71% of them. On the remaining 3%, fertility had increased. Opinion about the level of fertility in 1999 shows that 71% of the plots were of moderate fertility, 20% were infertile, and the remaining 9% were very fertile. Soil fertility management practices were limited to few convention ones and varied by perception of fertility (Figures 2 and 3). Ploughing in crop residues and planting legumes (crop rotation) were the dominant practices, occurring on 62 and 59% of the plots, respectively. These were followed by use of inorganic fertilizers (35%), household refuse (17%), and manure (9%). Use of compost, traditional or improved fallow, or green manure were very limited, occurring on less than 2% of the plots. Looking at the period between 1991 and 1999, use of inorganic fertilizers (i.e., proportion of plots used on) had almost doubled, although the average application rate was only about 33 kg/ha in 1999. Use of manure or fallow, on the other hand, had declined by more than 55%, while use of the other practices remained the same.

Given the predominant use of organic (recycling) methods and very little use of inorganic fertilizers (external inputs), in addition to the massive evidence of increasing negative nutrient

[19] In general, the low potential (drought-prone) districts are located to the eastern part of the region, while the high potential (non drought-prone) districts are located to the west and southern tip.

balances at the national and regional levels, it seems somewhat surprising that farmers should feel that soil fertility had not changed between the two periods on a majority of their plots. However, this may be attributed to the fact that farmer's are looking at fertility change within a relatively short period of time, as we find that about 40% of the plots had been operated for less than 8 years (i.e., not operated in 1991, the baseline period). The average period of holding for all plots was about 12 years. It is argued that soils have a large buffering stock of nutrients to keep production going for several years so that farmers may not observe declining soil fertility, especially within a short period of time (Smaling *et al*. 1996 and 1997).

We used the data and econometric methods to estimate the following model:

$$Perception of\ soil\ fertility_i = f(X_{1i}) \quad \textbf{(1)}$$

$$Fertilizer\ use_i = f(Perception of\ soil\ fertility_i, Organic\ method_{ji}(Fertilizer\ use_i), X_{2i}) \quad \textbf{(2)}$$

Equation 1 expresses farmers' perception of soil fertility on plot *i* as a function of a vector of factors (X_1), including information, knowledge and wealth of farmer (determined by gender, age, education, extension training, membership in community organizations, and ownership of livestock), history of soil fertility management on the plot (number of years of managing the plot, land use, use of inorganic fertilizers and organic methods, and use of fallow), and natural factors (rainfall and elevation). Equation 2 expresses amount of inorganic fertilizers used on plot *i* as a function of the perception of soil fertility, contemporaneous use of different organic methods (manure, legumes, crop residues, and household refuse), and other exogenous factors (X_2). The exogenous factors include socio-economic factors (household size, gender and age composition, education, access to markets, inputs, credit and extension, and farm size), plot characteristics (size, slope, irrigation, crops, and investment in stone terraces and soil bunds) and natural and village factors (distance to district town, rainfall, and population density). We first estimated equation 1 and then used the results in the estimation of equation 2, which also estimated separately for the two agricultural potential areas.[20] Description of variables and summary statistics are shown in Table 1.

The econometric results show that farmers' perception of soil fertility of plots are influenced by gender, previous extension training, wealth, number of organizations affiliated with, and type of previous soil fertility management (Table 2). Female household heads were more likely to perceive that their plots are more fertile. Household heads that have had previous extension training on soil fertility management perceived more infertile soils, while those who are wealthier (own more livestock) or belong to many associations perceived more fertile soils. With respect to past soil fertility management practices, plots that had been fallowed many times between 1991 and 1999 were perceived to be less fertile, while those on which household refuse had been used before were perceived as more fertile. Other previous soil fertility management practices (use of inorganic fertilizers, manure, crop residues, or legumes), as well as age, education, rainfall and elevation, had no significant impact on the perception of current soil fertility.

Results of estimating equation 2 (Table 3) show that farmer's were more likely to use and apply more inorganic fertilizers to plots they considered to be moderately fertile than those they considered to be very fertile or infertile. Other econometric results show that manure and household refuse tended to be used on more fertile soils. Crop residues and planting legumes, on the other hand, were used on less fertile soils. With respect to the effect of organic management practices, use of manure had a significant negative impact on inorganic fertilizer use, suggesting substitution among use of the two sources of plant nutrients. This finding is consistent with that of Omamo *et al*. (2002). Other organic management practices had varied significant impacts on the use of inorganic fertilizers.

[20] We used ordered probit to estimate equation 1 since soil fertility was measured as an ordinal indicator of perception, where 1=very fertile, 2=moderately fertile, and 3=infertile. For equation 2, we used a censored regression method since the amount of fertilizer used included both zero and positive values. To address the endogeneity problem, we used as instruments (i.e., variables assumed to be correlated with use of organic soil fertility practices but not with inorganic fertilizer use) proportion of household members that are male, tenure status of plot (owner-cultivated vs. rented; and whether or not expect to operate in the next five years), distance from plot to residence, ownership of oxen and livestock, and elevation.

Use of crop residues had a positive impact in low potential areas only, while use of household refuse had a negative impact in high potential areas only. Planting legumes had no significant impact on the use of inorganic fertilizers, but planting cereals had a positive and significant impact.

With respect to the socio-economic factors, older household heads (especially those in low potential areas) and more educated household members were associated with lower use of inorganic fertilizers. As expected, better access to input supply shops, extension training and credit, and higher rainfall areas were associated with greater adoption and use of inorganic fertilizers. However, examining these impacts in high versus low potential areas show that access to input supply shops was significant in high potential areas only while extension was significant in low potential areas only. The results also show that more populated areas were associated with lower use of inorganic fertilizers, contradicting Boserup's theory (Boserup 1965) that population pressure leads to more intensification of agriculture production.

3. Conclusion

Together, these findings suggest that farmers in the northern Ethiopian highlands are concentrating their scarce resources on their more fertile soils or that they are unwilling to invest their little inorganic fertilizers on the more risky infertile soils. Therefore, given that inorganic fertilizers (which are external to the system rather than recycling) were used on very few of the plots with moderate application rates, in addition to the substitution between use of inorganic fertilizers and manure, we can expect the problem of declining soil fertility to worsen. Thus, more effort is needed to promote the combined use of organic and inorganic sources of nutrients if the goal of restoring soil fertility is to be realized. Different strategies will be needed for less fertile soils. More awareness, education and extension training in the benefits of integrating organic and inorganic soil fertility management practices are needed. In addition, research and training in the types of organic materials and rates and proportions at which the two nutrient sources should be combined are needed (Palm *et al*. 1997).

Furthermore, improving availability and delivery of inorganic fertilizers, in addition to credit for their acquisition, are also very important. In addition, the attitude of all stakeholders needs to be changed from one of trying to maintain soil fertility to one of increasing it, if the goal of raising and maintaining high agricultural production is to be realized.

4. References

Boserup, E. 1965. *The conditions of agricultural growth: the economics of agrarian change under population pressure*. New York, USA: Aldine Press.

Ehui, S.K., Kang, B.T. and Spencer, D.S.C. 1990. Economic analysis of soil erosion effects in alley cropping: no-till and bush fallow systems in southwestern Nigeria. *Agricultural Systems* 34:349-368.

Ervin, C.A. and Ervin, D.E. 1982. Factors affecting the use of soil conservation practices: hypotheses, evidence, and policy implications. *Land Economics* 58(3):277-292.

Giller, K.E. and Cadisch, G. 1995. Future benefits from biological nitrogen fixation: an ecological approach to agriculture. *Plant Soil* 174:255-277.

Larson, B. and Frisvold, G. 1996. Fertilizers to support agricultural development in sub-Saharan Africa: what is needed and why. *Food Policy* 21(6):509-525.

Omamo, S.W., Williams, J.C., Obare, G.A., and Ndiwa, N.N. 2002. Soil fertility management on small farms in Africa: evidence from Nakuru District, Kenya. *Food Policy* 27:159-170.

Palm, C.A., Myers, R.J.K., and Nandwa, S.M. 1997. Combined use of organic and inorganic nutrient

sources for soil fertility maintenance and replenishment. In: R.J. Buresh, P.A. Sanchez and F. Calhoun (Eds.) *Replenishing soil fertility in Africa*. Madison, WI, USA: Soil Science Society of America.

Reijntjes, C., B. Havercoft, and A. Waters-Bayer. 1992. *Farming the future: An introduction to low external input and sustainable agriculture*. London: Macmillan Press.

Sanchez, P.A., Shepherd, K.D., Soule, M.J., Place, F.M., Burez, R.J., Izac, A.N., Mokwunye, A.U., Kwesiga, F.R., Ndiritu, C.G. and Woomer, P.L. 1997. Soil fertility in Africa: an investment in natural resource capital. In: R.J. Buresh, P.A. Sanchez and F. Calhoun (Eds.) *Replenishing soil fertility in Africa*. Madison, WI, USA: Soil Science Society of America.

Smaling, E.M.A., Nandwa, S.M., and Janseen, B.H. 1997. Soil fertility in Africa is at stake. In: R.J. Buresh, P.A. Sanchez and F. Calhoun (Eds.) *Replenishing soil fertility in Africa*. Madison, WI, USA: Soil Science Society of America.

Smaling, E.M.A., Fresco, L.O., and de Jager, A. 1996. Classifying, monitoring and improving soil nutrient stocks and flows in African agriculture. *Ambio* 25:492-496.

Woomer, P.L. and M.J. Swift (Eds.). 1994. The biological management or tropical soil fertility. Chichester: John Wiley & Sons.

World Bank. 2000. World development indicators CD-ROM. Washington, D.C., USA: World Bank.

Table 1. Description of variables and summary statistics

	Mean	Standard Error
Endogenous variables		
Perception of soil fertility status of plot in 1999 (proportion; cf: infertile)		
Moderately fertile	0.7240	0.0035
Very fertile	0.0807	0.0040
Fertilizer use in 1999 (kg/hectare)	39.9351	5.3109
Soil fertility management in 1999		
Whether used manure (0=no; 1=yes)	0.0941	0.0078
Whether used crop residues (0=no; 1=yes)	0.5942	0.0202
Whether used household refuse (0=no; 1=yes)	0.1702	0.0109
Whether planted legumes (0=no; 1=yes)	0.1662	0.0106
Explanatory Variables		
Plot level factors		
Size (hectares)	0.3252	0.0160
Slope (degrees)	5.7937	0.3196
Whether irrigated (0=no; 1=yes)	0.0466	0.0097
Proportion of area planted to cereals	0.6414	0.0186
Presence of stone terraces (0=no; 1=yes)	0.2002	0.0180
Presence of soil bunds (0=no; 1=yes)	0.0251	0.0055
Distance to nearest market (minutes)	85.0983	4.3593
Household level factors		
Sex of head (0=female; 1=male)	0.9505	0.0153
Age of head (years)	42.7302	0.8749
Average education of members (years)	1.8364	0.1777
Size (number of members)	6.7968	0.2068
Dependency (members <15 or >59 years) ratio	0.5353	0.0164
Size of farm (hectares)	1.3266	0.0655
Distance to input supply shop (minutes)	147.1963	8.4368
Whether extension on soil fertility management since 1991 (0=no; 1=yes)	0.6275	0.0367
Whether received government credit (0=no; 1=yes)	0.6830	0.0338
Village level factors		
Annual average rainfall (mm)	1179.5440	13.8235
Population density in 1994 (persons per square km)	131.8693	6.1662
Distance to district town/market (km)	34.4449	1.8725
Instruments		
Previous soil fertility management and land use		
Whether used inorganic fertilizers in 1991 (0=no; 1=yes)	0.1126	0.0197
Whether used manure in 1991 (0=no; 1=yes)	0.0879	0.0101
Whether used crop residues in 1991 (0=no; 1=yes)	0.3912	0.0292
Whether used household refuse in 1991 (0=no; 1=yes)	0.1293	0.0101
Proportion of main seasons 1991-1999 fallowed	0.0509	0.0073
Proportion of main seasons 1991-1999 planted to legumes	0.1706	0.0132
Proportion of main seasons 1991-1999 planted to cereals	0.6341	0.0155

Other factors

How long plot operated (years)	12.1751	0.6220
Whether plot is owner-cultivated (0=no; 1=yes)	0.8776	0.0193
Whether expect to operate plot next 5 years (0=no; 1=yes)	0.8847	0.0200
Distance from plot to residence (minutes)	15.5534	0.9293
Proportion of male household members	0.5262	0.0154
Number of tropical livestock units owned by household	4.0564	0.2197
Number of oxen owned by household	1.6855	0.0839
Number of local organizations household members belong to	1.8250	0.0783
Elevation (meters above sea level)	2125.9770	34.1707

Notes: Means and standard errors are adjusted for stratification, weighting and clustering of sample.

Table 2. Determinants of perception of soil fertility problem in 1999 in the highlands of Amhara region, Ethiopia (ordered probit)

Explanatory Variable	Perception of soil fertility status	
Plot level factors		
How long plot operated (years)	-0.0053	
Whether used inorganic fertilizers in 1991 (0=no; 1=yes)	0.0500	
Whether used manure in 1991 (0=no; 1=yes)	-0.2866	
Whether used crop residues in 1991 (0=no; 1=yes)	0.1927	
Whether used household refuse in 1991 (0=no; 1=yes)	-0.3715	**
Proportion of main seasons 1991-1999 fallowed	0.4870	*
Proportion of main seasons 1991-1999 planted to legumes	0.2631	
Proportion of main seasons 1991-1999 planted to cereals	0.2948	
Household level factors		
Sex of head (0=female; 1=male)	0.3010	*
Age of head (years)	0.0077	
Average education of members (years)	-0.0136	
Whether extension on soil fertility management since 1991 (0=no; 1=yes)	0.3503	***
Number of tropical livestock units	-0.0571	***
Number of local organizations household members belong to	-0.1829	***
Village level factors		
Annual average rainfall (mm)	-0.0001	
Population density in 1994 (persons per square km)	-0.0008	
Distance to district town/market (km)	0.0002	
F-statistic	5.2100	***
Number of observations	1040	

Notes: The dependent variable is an ordinal indicator of perception where: 1=very fertile, 2=moderately fertile, and 3=infertile. Coefficients and standard errors are adjusted for stratification, weighting and clustering of sample. * Statistically significant at the 10% level; ** Statistically significant at the 5% level; *** Statistically significant at the 1% level.

Table 3. Determinants of inorganic fertilizer use (kg/ha) in 1999 in the highlands of Amhara region, Ethiopia (censored least absolute deviation regressions)

	Total sample		Low agricultural potential areas		High agricultural potential areas	
Plot factors						
Perception of soil fertility status in 1999 (proportion; cf: infertile)						
Moderately fertile	347.5370	*	152.9835	**	81.2364	*
Very fertile	134.6975		256.9376	**	105.2428	*
Whether used manure in 1999 (0=no; 1=yes)	-174.8071	*	-87.4239	***	-10.4417	R
Whether used crop residues in 1999 (0=no; 1=yes)	-22.4547		55.0985	**	18.9391	
Whether used household refuse in 1999 (0=no; 1=yes)	-31.0452		-9.9499		-13.8491	*
Whether planted legumes in 1999 (0=no; 1=yes)	-10.6393		12.9721		-1.5285	
Proportion of area planted cereals in 1999 (0=no; 1=yes)	169.0348	***R	41.2414	***	24.0602	***R
Size (hectares)	26.0690		-10.6893		12.2394	R
Slope (degrees)	-6.3122	***R	-1.3288	***R	-0.4789	**R
Whether irrigated (0=no; 1=yes)	-18.4301		0.4356		1.7786	
Presence of stone terraces (0=no; 1=yes)	2.4058		9.6852		-5.0328	
Presence of soil bunds (0=no; 1=yes)	59.3713		36.5322		8.9971	
Distance to nearest market (minutes)	-0.1263		0.0320		-0.0081	
Household factors						
Sex of head (0=female; 1=male)	9.5054		-4.2898		4.0433	
Age of head (years)	-1.5619	**	-0.5777	*R	-0.0199	
Average education of members (years)	-7.7985	***	-2.3690		-0.8568	R
Size (number of members)	-2.6576		-1.1127		-0.3858	
Dependency (members <15 or >59 years) ratio	-66.6168		29.9748		1.1291	
Size of farm (hectares)	5.7852		6.6294		6.3040	*
Distance to input supply shop (minutes)	-0.2705	**R	-0.0312		-0.0281	*
Whether extension on soil fertility management (0=no; 1=yes)	110.5361	***R	22.8083	***	7.5922	R
Whether received government credit (0=no; 1=yes)	66.5108	***R	32.0807	***R	11.4163	***R
Village factors						
Annual average rainfall (mm)	0.1428	***R	0.0932	***	0.0449	***
Population density in 1994 (persons per square km)	-0.2658	**	-0.0760		-0.0074	
Distance to district town/market (km)	-0.0200		0.1312	R	-0.2628	***
Constant	-423.8886	**R	-227.4623	***R	-133.7088	***R
Pseudo R-square	0.1528		0.1912		0.0735	
Number of observations	1040		538		502	

Notes: Agricultural potential is defined by whether the district is drought-prone (low) or of higher rainfall (high), as classified by the Ethiopian Disaster Prevention and Preparedness Commission. In general, the high potential areas are located to the west and southern tip of the region, while the low potential are located to the east. Coefficients and standard errors are adjusted for stratification, weighting and clustering of sample. * Statistically significant at the 10% level; ** Statistically significant at the 5% level; *** Statistically significant at the 1% level. ^{R} means coefficient of same sign and significant at the 10% level when actual rather predicted values of perception and inorganic practices are utilized.

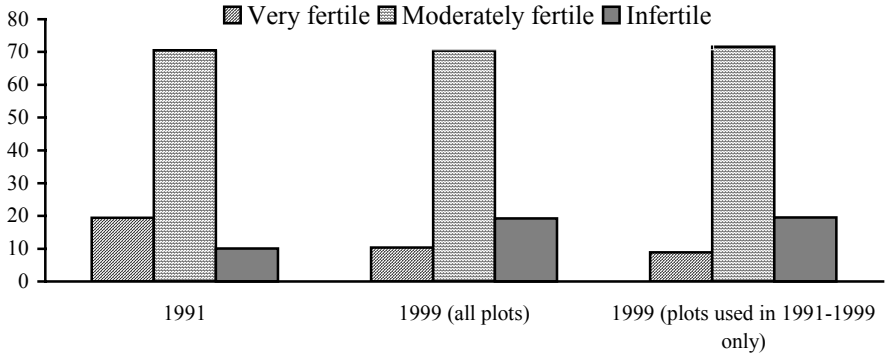

Figure 1. Perception of soil fertility in 1991 and 1999 (percent of plots)

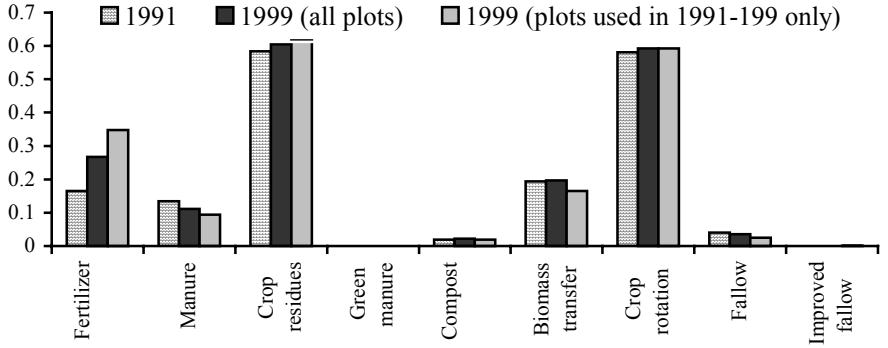

Figure 2. Soil fertility management since 1991 (proportion of plots)

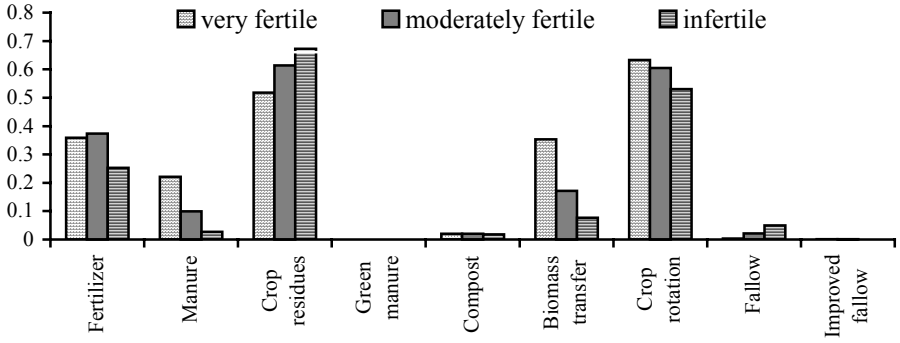

Figure 3. Soil fertility management practices in 1999 by perception of fertility in 1999 (proportion of plots)

VII. Land Tenure and Food Security in South Wello (Wollo) and Oromiya Zones, Amhara Region, Ethiopia:

Summary of the paper presented at BASIS/IDR Workshop

Yigremew Adal, IDR, Addis Ababa University

1. Introduction

For decades, food insecurity has been a serious problem for Ethiopia. The situation has worsened in scope and frequency particularly since the 1990s. Although the crisis has generally been increasing in scope and volume throughout the country, the northern part of the country is, as usual, the most affected area. The case of the Amhara region, one of the drought-prone areas of northern Ethiopia, reflects this worsening crisis.

Although drought is the most commonly mentioned cause of famine in the northern highlands of Ethiopia, inappropriate land policies are among the factors frequently cited as underlying cause. Of course, land tenure has become an essential element in the policy dialogue about food security and poverty reduction in general. Adequate access to land and other natural resources is considered to be one of the key indicators of food security. Land is seen as the primary means for generating livelihoods for most of the rural poor. It is also argued that access to land will affect not only productive outcomes but also the ability of the poor to access credit, make investments, and generally benefit from the legal system.

At present academic literature and government documents acknowledge that in highland Ethiopia land tenure problems (particularly tenure insecurity) are affecting the country's food production and household food security. The most frequently cited problems of rural land policies since 1975 include: (a) constrained access to land; (b) tenure insecurity; (c) diminution of size of holdings and fragmentation of plots; (d) inefficient allocation of land; (e) discouraging peasant movements off and into non-farm occupations; and (f) inappropriate land administration.

Many people argue that despite recent policy changes by the current government toward a more liberal market economy, there are no fundamental policy changes regarding rural land. Moreover, there are some studies that indicate the continuation of inappropriate land polices are having adverse effects on the country's development. The same problematic land policies and land administration practices continued after the 1991 change of government. Therefore, in relation to agricultural production and food security, land tenure remains a hotly debated and contested issue among different parties.

This paper is an attempt to examine tenure-related issues as they affect rural livelihoods in the BASIS research areas of South Wollo and Oromiya Zones, Amhara region. The data are mainly drawn from the surveys and community assessment studies of the BASIS project conducted since 1999. It is important to indicate here that land tenure issues were not among the major focal areas of the study and both the methodology and data collected limit analyses of the effects of land tenure on food security.

2. Findings of the BASIS Study from South Wollo and Oromiya Zones

The following were important findings about land tenure in the BASIS study region.

Land scarcity and landlessness. The BASIS study area, namely South Wollo and Oromiya zones, is known for constraints on land resources. Land scarcity, soil degradation, rugged

terrain, inadequate rain and water scarcity in general, and pests are among the most important constraints on agriculture in the area. Different sources point out that South Wollo and Oromiya zones of the Amhara Region have the smaller average farm sizes per household than the ten other zones of drought-prone regions of Wollo and Tigray. Review of kebele documents for the BASIS/IDR study also shows that about 19% of households were reported as landless. From the community assessment study, the average land holding size of 62% of those study communities was reported to be 0.5 ha or less per household and 81% of the total communities reported having less than 1 ha per household. Moreover, it was reported that 22% of households in those communities were landless. A South Wollo Zonal Administration report in 2003 also shows that the average household landholding of the zone was 0.85 ha, where 0.7 is used for crop production and the rest for grazing. These numbers show that farm sizes in South Wollo are far below the estimated national average of 1.00 ha. Household survey results also show that about 62% of the sample households hold one or less hectare of land, while about 31 % have one to two hectares. Given the low level of productivity and soil fertility existing in the country, it can be said that South Wollo and Oromiya households are land-starved and could not be expected to produce enough food for self sufficiency even during good rainfall seasons. From an agro-ecological perspective, the BASIS community assessment and household study indicate that households in the dega (highland) areas had smaller average land holdings than those in the woina-dega (midland) and kolla (lowland) areas.

Gender dimension. The Central Statistical Authority 2000 survey report shows that at the national level, about 19% of agricultural landholders are women. The proportion is almost the same for the Amhara region (18.62%) and South Wollo (19.42%) and a bit less for Oromiya zone (about 15%). However, in the study weredas it was found that while about 19% of the total households are landless, out of them about 41% are women. This figure is higher than the total proportion of female-headed households (30%), indicating that relatively more female-headed households are landless than male-headed units. While only about 17% of all male-headed households are landless, the figure is 26% for female-headed households.

Parcel-level data from the BASIS household study also show that while the average holding for all the households is 0.84 hectares, female-headed households have an average of 0.69 hectare and male-headed households hold 0.89 hectare. This means that land holdings of female-headed households are on average only 77.5% of those of male-headed households and 82% of the total average holdings. However, because average household sizes are 5.35 members and 3.68 for male and female-headed households, respectively, in terms of per capita landholding members of female headed households have slightly more land than their male counterparts: 0.19 ha versus 0.17 ha. This shows that when household size is considered, female-headed households have larger holdings than their male counterpart.

Fragmentation. Findings from household study show that on average there are less than three parcels per farming household and the average walking distance to each parcel from the residence is about thirty minutes. If distance and number of parcels are the major arguments against fragmentation, it seems that fragmentation is not a serious problem among survey households. However, there are reports of parcels that six hours walk from the residence and some with six parcels, showing a serious problem of fragmentation in a few cases.

Land Transactions. The community assessment study in 1999 revealed that the main mechanisms to gain access to farmland were through land redistribution, sharecropping, and inheritance. No land sales and mortgages were reported, though it is likely that they do exist on the ground. The same land transfer arrangements were observed during the survey. It was found that sharecropping was the most important means of land transfer and accounted for 92% of total

parcels transferred. The total number of parcels reported by sample households was 1,286 and those in transaction were 326 (24.5%). Out of the total parcels, 196 (15.2%) were leased/sharecropped out and 117 (9.1%) leased/ sharecropped in. Mean size of land transferred out was 0.62 ha and mean size of land transferred in was 0.60 ha. At the same time 17.3% and 25.2% of the households were engaged in transferring-in and transferring-out land through share-cropping, respectively. Cash rental is the second important mechanism, accounting for about 7% of all parcel transfers.

Average size of transferred parcels was 0.36 ha. It was found that duration of sharecropping and other contracts varies widely**.** In about 37% of the cases the contract life was one season, while in 63% of the cases contract periods were not specified. Share of output in sharecropping arrangements was generally 50% and the amount of output received/given was 0 .75 quintal (a quintal is about 100 kg of grain) per parcel. The average amount of the rent paid/received/ was 150.45 Birr/parcel. It was also found that in such transactions crop residue was shared in about 13% of the cases, while a cash advance was required in approximately 18% of the cases. Regarding the reason for transferring land out it was reported that 51% is due to lack of oxen or labor. Of course, ox is a scarce resource in Wollo. The South Wollo Administration report (2003) shows that in the zone the average oxen per household was less than one (0.79), 45% of households have no oxen at all, 36% have one, and 17% have two oxen. 9.5% of the households reported that they lacked both labor and oxen and 11% rent their lands out for lack of oxen and seed.

During the community assessment community members reported that during the last land redistribution, land was given to those resource-poor people, returnee soldiers, returnees from resettlements, and to the landless and land-poor. It was mentioned that sharecropping was taking place between those resource-poor (mainly women and elderly people who lack labor, oxen etc.) and those relatively 'well off' peasants. In relation to its trends, it was reported that landholders have started demanding cash in advance in the form of loans, and they have also started dividing crop residues equally with the tenants while previously the latter used to take it totally.
Questions related to the importance of social relations in land transactions show that among those who entered in land transactions, family/kin members were important in 64% of the cases and neighbours in 15% of the cases. However, it was also reported that in 20% of the cases, transactions were conducted with outsiders. Mutual help (7%), fear of loss of land (6%), good management (5.2%) and difficulty to get land from other sources (4.3%) were mentioned as reasons for preferring to deal with relatives in land transactions. Questions were also asked regarding the reasons why some people prefer short periods of time for land transaction contracts. In 45% of the cases it was indicated that landowners are not interested in such arrangements; but in 21% it was because of fear of loss of land and in about 4.5% cases for fear of redistribution. In a few communities bordering the Afar region conflict over land was also mentioned as one of the constraints to land transfer.

Land quality and management. The survey revealed that soil infertility is an important constraint to crop production in the study area. Peasants were asked about the fertility of their parcels. The parcels were classified as fertile, semi-fertile and unfertile in 33.2%, 49.5% and 17.3% of cases, respectively. Respondents also reported trends in soil fertility through time and noted that it increased in 10.7%, did not change in 15%, and decreased in 74.3% of cases. Those who reported increases in soil fertility pointed to fertilizer use (34%), application of manure (35%) and soil conservation activities (17%) as the reasons. The causess for decreasing soil fertility were soil erosion (27.7%), drought (27.6%), and continuous cultivation (34.7 %).
In terms of land management, households were asked about different soil management and conservation measures. It was found that only 11.4% of the parcels were irrigated (and this is

mainly in Gerado Kebele in Desie Zuria), manure was applied in only 10% of the cases, stone bands in 22.7%, soil bands in 25% of the cases, terracing in 24%, and strip cropping in 10% of cases. Some of these measures may depend on the topographic features of the parcels and other factors (e.g. terracing often depends on the steepness of the parcel's slope), so caution is needed in interpreting these figures.

Constraints to soil conservation practice were also part of the survey questionnaire. The two most important constraints mentioned were lack of labor (42.7%) and lack of money (15.5%), which together constitute about 58% of all mentioned problems. In this regard, labor shortages seem an important phenomenon in rural Ethiopia and requires further investigation for what is generally assumed is abundant. But, the financial constraint in soil conservation is not clear and also needs further study.

3. Concluding Remarks

The BASIS/IDR studies have generated considerable data on land tenure and food security issues. This is important in terms of revealing insights into relationships between land tenure and food security in the region. This is also an important issue at a time when food security issues are among the highest policy priorities.

Tenure issues covered in the BASIS study include access (size of holdings, mechanisms of access), land transfers, land management, fragmentation, and certain aspects of tenure security. Tentative conclusions suggest that households from South Wollo and Ormiya zones have more serious land shortages than other parts of the region and of the country in general. Though it is not easy to capture land tenure dynamics through survey methods, it seems that land transfer/transactions in the study region are also limited in some respects. Contracts are mainly limited to sharecropping, are for short periods of time, and are translated predominantly among relatives/kin. It also seems that there is only limited effort in terms of land management and conservation. Both irrigation and application of manure are limited in scope. Results of the survey also indicate that the major constraint on land conservation is lack of labor.

However, while these data can serve as a starting point for further study, they do not tell us the process and the mechanisms by which land tenure issues happen and how they impact food security. For instance, except for land shortage, there are no survey findings that explain the direct impact of tenure on food production. Therefore, specific qualitative studies are required to investigate the nature of the existing land tenure at the local level and its impact on food security. In the next year of the project, this should be conducted to supplement the survey work and collect information unavailable through survey methods.

VIII. The Performance of Micro-enterprises in Small Urban Centers of the Amhara Region

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1. Introduction

Micro-enterprises, which are mostly in the informal sectors of the economy, contribute significantly to local economic development. In the 1950s and 1960s, micro-enterprises were viewed as marginal and unproductive activities that evaded taxes and had little potential for growth or entrepreneurial capacity. In the 1980s, however, micro-enterprises received more favorable attention from donors and governments as potentially sustainable ways of combining equity with efficiency in the long run. Micro-enterprises can stimulate the local economy by increasing aggregate demand and allowing for greater investment. Micro-enterprise, by being particularly suitable to areas where medium and large firms are unfeasible, contribute to decentralized development, regionally balanced growth, and small town growth.

Small towns are found at the lower level of urban hierarchy and are where many small enterprises are found. They play an essential role as regional service centers in rural hinterland development through direct production linkages and trickle-down like effects [21]. These functions of small towns are achieved through a myriad of economic activities carried out in these towns. The nature and dynamism of local economic activities, including those of different enterprises, are important determinants of the performance of the small towns.

One source of growth for small towns development is the performance of the hinterland. Researchers have argued that small towns in rich hinterlands are more vigorous than those in relatively backward hinterland.[22] Macro policies--particularly related to agricultural, trade, and infrastructure policies--will have a significant influence on small town development. Small towns are also seen as a way of organizing economic activities or enterprises in space[23]. Thus the growth of small towns, to a large extent, depend on the performance of enterprises and their interactions with the environment.

This paper examines enterprises in small towns of the Amhara region with the view to understanding their economic performance. The specific objectives are

1. To examine the nature and structure of small businesses found in small towns
2. To examine the economic characteristics of small businesses in terms of their income, capital, and credit performance.
3. To identify factors which contribute to economic well being of small businesses in the small towns.
4. To derive suggestions for the promotion of local economic development in smaller urban centers.

The study was conducted in six small towns in the Amhara region. These are Akesta, Dogollo, Werilu, Tita, Haik and Bati. Five of the towns are found in the South Wollo Zone, while Bati is

[21] Hinderink Jan and Titus Milan, 2002, "Small towns and regional development: Major findings and polic implications from comparative research" Urban studies, V.39, No.3 pp 379-391
[22] Hinderink and Titus
[23] Poul Ove Pederson, 1989 The role of small enterprises and small towns in the developing countries and in the developed. CDR project paper 89.1

located in the neighboring Oromiya zone of the region[24]. The four towns namely Tita, Bati, Akesta and Dogollo are found in BASIS study woredas. The remaining two towns namely Haik and Werillu are found adjacent to BASIS study woredas.

The six towns differ in their size, location and their hinterland, although all of them are designated as small towns. Bati and Haik are the two biggest centers relative to others. Haik and Tita are found along the Addis-Mekele road, while all other towns are found off the main road about 100 kms or more away from Desse and Kombolcgha, the two big centers in the area. Four towns--Tita, Akesta, Bati and Haik--are found in food insecure woredas, while Dogollo and Werillu are found in relatively 'better off' agricultural woredas. The fact that the majority of towns are found in food insecure woredas makes enterprise and business development significant, as they could provide alternative incomes to enhance food security and reduce poverty in the area.

The primary data for this study were obtained through a sample survey of enterprises. A new sampling frame of businesses was constructed for each town by making door-to-door visits of businesses with the help of knowledgeable, local assistants. The businesses were then categorized into trade, services, food and drinks, manufacturing and processing and handicraft. A total of 332 enterprises were randomly selected from the six study towns. From each town, a total of 50 enterprises or more were selected from the different categories. A structured questionnaire was administered to each selected enterprise. The questionnaire contains information on the general characteristics of the business and business operators. Summary statistics were produced to describe the nature of the businesses. A multivariate analysis was also employed to identify the explanatory factors for the economic performance of the businesses.

2. Theoretical Perspectives

The Role of Micro-Enterprise (Small Enterprises) in Regional Development

Classical development theories, such as modernization and dependency theory, view small/informal enterprise as low or unproductive activities. In modernization theory, development is seen as a process whereby agriculture is gradually mechanized and where small, low productivity artisan workshops are substituted by large scale, mechanized industrial enterprises of higher production. Production is concentrated in towns to exploit urban and economies of scale. Small enterprises are predicted to eventually disappear.

The dependency/dominance theory views large national and international corporations as dominating the economy of the world. These corporations are headquartered in the capital cities of developed countries, but their production units are spread over countries and regions where there are cheap production factors and resources. These businesses, which exploit cheap factors and enjoy economies of scale, are more profitable than small, local enterprises. Under these circumstances, the theory posits that small enterprises survive either in direct dependency on the large enterprises, as sub-contractors, or as petty producers or traders operating in extremely competitive markets with no possibility to earn profits sufficient for investment and grow[25].

Recently, the views on micro-enterprise/informal sector have changed, since large scale industrialization schemes in many parts of Africa and developing countries generally resulted in poorly integrated economies. Under this type of industrialization most of the expertise, capital equipment, and inputs had to imported from abroad. Similarly, most of the profits also left the country in different forms and the enterprises had a poorly sustainable effect on indigenous

[24] These towns are selected because they fall in the BASIS project area which has sponsored this study.
[25] Pederson Poul, 1995

businesses. This created a space for the development of MSE/IO (informal organizations) to fill in the development process. Thus the development of MSE (medium and small enterprises)/IO is not a temporary process, but part of a process of development from below in which small enterprises can grow larger as long as the growth is needed and justified (ECA, 1998). The MSE/ISO, due to their smallness, could survive in regions where limited purchasing power and infrastructure prohibit medium and large enterprises. Thus, MSE/ISO contributes to decentralized development and regionally balanced growth.

Some recent views on micro-enterprises include: the network approach; the hierarchy of enterprises and flexible specialization mode; and "small enterprises as reproductive activities of households" perspective. The network approach views enterprises not as a homogenous, independent entity but in a network of organizations and households through which commodity, labor, money, information, innovation flow. The way that this network is manifested represents power relations and a learning process

A hierarchy of enterprise and flexible specialization assumes that spatial integration and stabilization promote large-scale production. Under this view, new room is created as small and unstable markets difficult for small enterprises. Small enterprises follow three strategies in their operation in unstable and small market. The first is flexible specialization which argues that firms invest in multi purpose machinery and employ skilled labor. This enables firms to shift production between different markets. The second strategy is minimizing investment in machinery and limiting hired skilled labor in order to reduce fixed cost. The third strategy is that small enterprises survive by doing out-source work for larger enterprises.

The view which considers the small enterprises as a reproductive activity of the household argues that small enterprise and households are highly integrated. Competitiveness is not based on technical efficiency, but is due to resource transfer from household or from external sources. The purpose of the enterprise is to contribute to the reproduction of household. Household reproduction may be derived from farm, wage work, family enterprise, transfers and other livelihoods.

3. Enterprises' and Operators' Characteristics

Some Characteristics of Enterprises

A total number of 332 businesses are run by 315 operators in our sample in South Wollo and Oromiya zones. This shows that most operators run a single business and only a few operators manage more than one business activity. A wide range of activities, including services, trade, food and drink making and selling, manufacturing and processing, handicraft and cottage industry, are practiced in the study area. Service activities[26] accounting for 33 % are the predominant type of activities, while food and drinks[27] are the second most important and account for 27 %. The two types of activities, services and food and drinks, together comprise 60 % of all the activities in the study area. Trade, handicraft and manufacturing and processing form 22%, 11 % and 7 % of the sampled establishments, respectively. Traditional crafts and processing are not practiced very much in the study area. Some towns such as Werillu and Tita have a higher proportion of businesses in the handicraft sector than is found in other towns.

[26] Services include construction, repair, tailoring, photographing, transport, shoe shining, hair cut etc.
[27] Food and drinks include hotels and beds, restaurants, tea and pastry, bakery, injera making, butchery, traditional drink making etc are included under this category.

The total number of people employed in the sampled activities are 600, of which 74 % are from family labor sources. About 64 % of the total employment is accounted by Food and drinks (38 %) and services (26 %). Food and drinks and services, therefore, dominate both the number of enterprises and employment in the study towns. Handicraft and cottage and manufacturing and processing generate considerably less employment than these two sectors.

Most of the businesses are single-person operated and very small. Trade, handicraft, and services average 1.43 employees per establishment. Those with over 2 persons per establishment are in food and drinks (2.48) and manufacturing (2.71). The latter are also activities with the highest proportion of hired labor.

The survey has shown that about 71 % of the businesses have no permanent business premise. These businesses mainly use their home and road side and traditional market sites as their working places. Business enterprises in the study towns are mostly started by those who had no option at all. About half (51 %) of those who are heading enterprises cited lack of alternative as the prime motive to engage in the business. This response is in line with the assertion that business formation is initiated by those who are displaced, marginalized, and have no alternatives, and not by capital-rich entrepreneurs seeking good investment opportunities.

A significant proportion (52.1 %) of total sampled businesses in area's small towns operate without license. Handicraft and cottage and services are the two most important activities where the majority of enterprises have no licenses. About 88 % of those in the handicraft sector and 67 % in the service sector are not licensed. Manufacturing and processing is more formal in its operation as the majority (91 %) of these are licensed.

Almost all the businesses in the study area have a single owner. In total, about 97.3 % are run by a single owner. There are no subsidiary businesses or share-holding companies. Those who reported some form of partnership are only 2 % of the businesses. This is in strong contrast to the experiences of other countries where small businesses of small towns tend to be subsidiary plants of large companies located elsewhere.

The extent to which businesses belong to a support group or business network was investigated in the study. About 98 % of the business owners indicated that they do not belong to any kind of business association. Again, this contrasts to the network approach to industrial (enterprise) development, which views the single enterprise not as a black box but as a group of organizations cooperating on an intra-enterprise and inter-enterprise basis.

Infrastructure, services, facilities, government policy (local, regional and national) and regulations determine the performance of businesses by influencing profitability and production costs. An attempt was made to identify which elements of the business environment prohibit the growth and development of small enterprises in the area's small settlements. Telecommunication, electricity and access to land were indicated as major business obstacles by 43 %, 46% and 41 % of enterprises, respectively. Tax rates and tax administration were also considered as major obstacles by 33 % and 34 % of the businesses, while collateral requirements for gaining access to finance was regarded as a major problem by 24 % of the businesses.

Business Operators' Characteristics: Demographics and Socioeconomic Conditions

Almost all businesses are run by family members. Most of the business operators are household heads (87.9%), while spouses and children represent 5.1 % and 5.7 % , respectively. About 19 % of the business operators are female.

The sex of interviewees for the main activity group shows that a higher participation of females (79 % of total) is noted in the food and drinks category. Perhaps this is not surprising given the fact that businesses in the food and drinks category involve 'injera making and selling'; 'tell and Araki making and selling', activities which are all dominated by women. There are no females participating in manufacturing and processing. A significant proportion of males (39.4%) are found in the service sector.

The average age of the business operators is nearly 38 years old, with females being older (43.5 years) and males younger (36.4 years). The age group distribution shows that most of the operators (34.9%) are found in the age group 26-36, which indicates that operators tend to be younger. About 12.4 % of the operators are in the oldest age group with an age of 59 and above. The proportion of female operators (24.6 %) in the oldest age group is higher than the male operators (9.4%).

The average family size of those interviewed is 3.93 or nearly 4, which is considerably below the average size for farming households (see workshop papers by Roth and Mogues and Negatu). The mean household size of the economically active members (the age group 15-60 years) is only 2.6 persons. The proportion of economically-active members, however, is less than one or 0.76. The inter-town variation in family size and economically-active members is very slight.

Regarding the educational status of the operators, 23 % of the business operators had no formal education, which is considerably better than the general population in the BASIS household study. Nearly half or 48 % of the female operators fall in this category. At the other end of the spectrum only 4.4 % of the household heads have more than 12 years of education. There is no female respondent with more than 12 years of education. The modal group (32 %) among the heads had secondary education. A substantial number (29 %) also had primary education. These indicate that a significant number of business operators in the study towns have had considerable exposure to formal education. This together with the age distribution of the business operators seem to indicate that the opportunity for gaining employment in business operations goes to younger and better-educated persons, although there is some opportunity for uneducated, older and female group particularly in some activities such as food and drinks. A three-way classification of education by sex and by activity category revealed that the majority of females (79.3 %) with no education are engaged in food and drinks activities. The average number of individuals in households with junior high school or more education is 1.65. The average proportion of the same in a household is 0.44, which is much less than one person. The overwhelming majority of both males and females business operators do not have business training.

Asset ownership of the family has some implications for the business operation. For instance own residence could be used as collateral for borrowing for the purpose of the business. This, of course, depends on the type of residence owned as some buildings may not have great value. The survey shows that it is only a little over half of the business operators who possess own residence. A significant proportion i.e., about 42 % do not own a residential building. Those who lack own business premises are even higher at about 71 % of the total. Other types of assets, such as TV

and radio, could be important sources of information that could be used as inputs to the business. TV is owned only by 6 % of the operators, while radio is owned by about 62 % of the operators--both of these percentages are well above those of the BASIS household study. The lack of TV by the majority of the operators may signify that these operators do not have access to information transmitted by Television.

4. Economic Performance of Enterprises: Capital, Income, Savings, Input and Output Linkages

Initial Investment, Current Capital and Working Capital

The initial investment of most of the enterprises is very low. About a quarter (24.8%) of all enterprises have an initial investment that ranges between 5-100 birr, while a little over half of the enterprises have started their business with initial capital of up to 500 birr (less than US $75). Enterprises in the handicraft and cottage and food and drinks categories have the highest proportion of enterprises with very low initial investments. The low investment requirements is an indication that there is low entry capital barrier for these firms.

Those enterprises with relatively higher initial capital are found in the manufacturing and processing category. About one-third or 32 % of enterprise have started their business with capital that ranges between 2000-5000, while the majority of enterprises in this category (36.4 %) have started their business with over 20,000 birr (> US $ 2,300).

The amount of working capital of different enterprises reflects the same patterns observed for the initial investment with some slight differences. The working capital in the size category of up to 500 birr is reported by 50.8% of the enterprises. The survey clearly shows that for most of the enterprise the principal source of fund for initial investment and operating capital is own saving. For all activities, over 60 % of the respondents reported own saving for initial investment and over 90 % reported the same source for operating capital. The second most important source of fund to start the business is found out to be friends and relatives. In general banks, moneylenders, government loans, and other outside sources are not important sources of fund to start businesses.

Sales (Revenues) and Trends in Income

The sales or revenue data are used to assess the economic status of the enterprises[28]. The survey shows that over half of the enterprises (57%) reported weekly sales of up to 100 birr. About 90 % of these enterprises have weekly sales of up to 500 birr. Nearly two-third (65.2%) of the enterprises in food and drinks category and 59.3 % in services category earn only up to 100 birr per week. Enterprises in Manufacturing and Processing category are the ones with relatively high weekly sales. For instance 17 % of the enterprises in manufacturing and processing earn weekly sales that range between 500 and 2000 birr. The distribution of enterprises by revenue category is evident of the low income that is derived by these enterprises. Not only is income low, but it was found out that the majority of enterprises reported that their income is decreasing. Two reasons that were given for this declining income by over 70 % of the enterprises in all categories of business are the presence of too many operators and weak purchasing power of customers. The former indicates that the small businesses are excessively abundant and that the market is perhaps over supplied, while the latter shows the problem caused by low incomes of clients. The major customers for micro-enterprises are the hinterland farmers. These farmers who are living in food insecure woredas are impoverished and cannot afford to consume the outputs of these enterprises.

[28] Net earnings, which relates revenues to costs, would have been a better indicator but since the cost data from the enterprises were unreliable, this indicator was not used.

Expansion of business

Current business capital was compared with the initial capital investments to gain an insight into what happens to the businesses in terms of expansion. About 20 % of the businesses have shown a negative growth, which indicates that these businesses are perhaps de-capitalizing. The remaining 80 % have shown a positive increase in capital accumulation, but the level is very low For instance, about 9 % have not shown any capital accumulation as their current capital is similar to their initial investment. About 26 % have shown an increase in capital accumulation up to 20 % per year, while 14 % have shown an increase between 20 and 50 %.

Credit and Savings

Very few enterprises reported borrowing in the last 12 months. A total of 43 businesses ,or 13.6 % of the sample, have borrowed out of a total of 315 enterprises[29]. The average amount borrowed is 40255.12 birr, which is a very sizeable amount relative to annual revenues. The Amhara Credit and Savings Institute (ASCI) and friends and relatives are the main sources of credit for those who borrow. Banks and other micro finance institutions are less important. Those who have borrowed from banks number only nine, or less than 3 percent of the sample.

Suppliers' credit is not very popular among small businesses. On average, only 20 % of businesses reported that they buy items on credit. Haik (37%), Bati (17 %), and Tita (17%) have relatively more businesses who enjoy suppliers credit. The two towns, Haik and Bati, are relatively bigger centers in the study area, while Tita is found very close to Desse, the capital city of the South Wollo Zone.

Involvement in Iqub and Iddir[30] showed that about one fourth of the interviewees have participated in iqub. The highest is found in Dogolo, where a little over half of those interviewed have participated in Iqub in the last 12 months. Though only 34 individuals or 41 % of those who participated responded to the question on the use of money from iquib, it is found that the majority do use the funds for business expansion. This indicates that iquib could be used as instrument to promote businesses in the area. A substantial number of those who responded also use their savings from iquib for consumption purposes particularly for food and cloth purchase.

Iddir is more frequently practiced than iqub. About 70 % of the interviewees are members of iddir. The monthly contribution is very low (about 2 birr). Iddir has no role in business expansion, since it does not provide loan or could not be used as source of fund for the business.

Local and External Linkages of Businesses

In terms of inputs, 50 % of businesses receive their inputs from local sources. while nearly 44 % from the regional capitals, particularly Desse and Kombolcha. Very few (5.4%) businesses receive their inputs from the national market. The regional linkage is not, however, strong with regard to business outputs and linkages. All in all about 85% of the businesses in our sample have local markets, while only 14 % sell to regional markets. The national market is very insignificant for businesses in the small towns of our study region.

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[29] The number of enterprises who have lent money as money lender are only 11 or 3.5 %.

[30] Iqub is a traditionally arranged revolving fund which is contributed by members. Iddir has more of a social function than Iqub

Growth constraints and possibilities for expansion

Slightly over one-half (51.7 %) of the enterprises indicated that expansion is virtually impossible. Those who indicated that it is possible to expand their businesses are only 10 % of the sample. Lack of working capital was indicated by nearly 54 % as the major constraint to business expansion. Lack of demand was considered to be the main obstacle by about 23 %, while 6 % mentioned lack of premise at affordable rent These three obstacles are mentioned by 83% of the enterprises.

5. Regression Analysis

A multivariate analysis was carried out to understand the determinants of gross sales per week. As noted earlier, it was not possible to determine net income as expenses were not correctly recorded. Similarly, the scale of operation (captured by total capital of the business) is analyzed to infer about the potential for modernization of the enterprises.

A set of several independent variables are thought to influence sales and business capital. These are: Demographic(Education, Age, Sex); Access to utilities (Use of electricity; Use of telephone); Use of bank services; Membership in *equb*; government regulation (own business license); access to information (own radio, own TV); asset base and income diversification (own residence house, own business premise; number of income sources); Access to capital (current working capital); site dummy variables (five dummy variables for the six sites); activity dummies (four dummy variables for the five main enterprise activities).

Results of Regression Analysis of Weekly Sales

The results of the semi-log function for gross revenue showed that working capital, site dummies, dummy for manufacturing and processing, bank account maintenance and participation in iqub, ownership of TV, radio and licenses are significant (see Tables 1 and 2).

Working capital influences gross revenue positively and significantly. Given that access to credit is extremely limited, it is not surprising that enterprises with more capital have managed to produce and sell more products than others. Indeed, the amount of working capital is the single most important determinant of gross revenue in the study towns.

All the site dummies are significant and negative, implying that business performance (as measured by weekly volume of sales) in Bati (the control town) is better, holding other factors constant. It should be recalled that Bati has a relatively large population and is situated on the road to the port of Djibouti/ Assab. As expected, larger population and dynamic business environment positively influence performance.

Only the coefficient of the dummy variable for manufacturing and processing is significant and positive among the activity dummies. The result suggests that the performance of the manufacturing and processing sector is better than food and drinks (the control sector) and other sectors.

The influence of maintaining a bank account and participating in i*qub* (association for rotation of savings) was tested, and the results show that the two variables positively and significantly

Table 1: Model Summary (Weekly Sales Model)

Model	R	R.Square	Adjusted R Square	Std.Error of the Estimate
1	.824	.678	.650	.9048

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	464.657	24	15.361	23.649	.000
	Residual	220.226	269	.819		
	Total	684.883	293			

Table 2: Regression Results: Dependent Variable: natural log of sales per week

	Unstandardized Coefficients	t- value
(constant)	3.304	7.095
Level of education	1.860E-02	.3620
Age square	1.077E-05	.051
Sex	-5.703E-02	-.326
Electricity	-.375	-2.653
Telephone	.200	.936
Radio	.290	2.109
TV	.426	2.108
Own residence	9.679E-02	.682
Own business premise	.131	.884
Working capital (natural log)	.256	6.217
Bank account	.276	1.672
Iquib	.251	1.936
Number of income sources	4.637E-02	.382
D-Akesta	-1.122	-5.800
D-Dogolo	-1.385	-6.321
D-Wereilu	-1.248	-6.285
D-Tita	-.753	-3.485
D-Haik	-.523	-2.772
License	.559	3.377
Age	-4.422E-03	-.231
D-Trade	-.140	-.783
D-Manufacturing and processing	.553	2.159
D-Handicarft and cottage	.104	.465
D-Service	.111	.627

influence weekly sales. The regression results clearly prove that the performance of TV and radio owners is significant as evidenced in positive and significant coefficient. In the absence of alternative sources of information, access to mass media could be vital to gain knowledge and information about new ways to do business and learn about markets (e.g. advertisements). Individuals need to recognize the value of information to build their capacity or human resource capital.

Regarding government regulations, license holders consistently performed better than non-holders. This may be attributed to indirect pressure to innovate, improve performance and compete with the unlicensed operators who have no cost of license renewal and taxes. The other variables, some contrary to expectations, were found to be insignificant. Among these are demographic variables, risk taking capacity, access to utilities, etc

Scale of operation (proxied by business capital)

As the results above clearly demonstrate, lack of finance (to serve as working or fixed capital) is the greatest constraint to the growth and development of small and micro-enterprises. Low level of capitalization is also a major characteristic of the firms. Hence, attempts were made to identify factors correlated with the amount of estimated enterprise capital. A similar set of independent variables were used in the regression (see Tables 3 and 4).

Among the variables positively and significantly related to business capital are: telephone, radio, TV, bank account and i*qub,* license, and gender. Operators with access to telephone, radio and TV appear to have more capital than those who without access. Similarly, bank account, i*qub* and license are positively related to amount of capital. Moreover, male owners operate with more capital than female owners. Unlike sales, there are no major differences between the study areas in the amount of business capital.

Table 3 :Model Summary (business capital model)

Model	R	R.Square	Adjusted R Square	Std.Error of the Estimate
1	.845	.714	.692	1.3393

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1255.478	21	59.785	33.329	.000
	Residual	504.056	281	1.794		
	Total	1759.534	302			

Table 4 : Regression Results: Dependent Variable: natural log of estimated capital

	Unstandardized Coefficients	
(constant)	2.955	4.485
Level of education	9.400E-02	1.249
Age	8.274E-02	3.054
Age square	-8.081E04	-2.700
Electricity	-.158	-.769
Telephone	1.263	4.205
Radio	.624	3.246
TV	.882	3.068
Bank account	.862	3.687
Iqub	.390	2.064
Number of income sources	.132	-.763
D-Akesta	-.479	-1.725
D-Dogolo	-.211	-.678
D-Wereilu	-.440	-1.542
D-Tita	-.284	-.934
D-Haik	.377	1.378
License	1.942	8.939
Sex	.627	2.442
D-Trade	.643	2.532
D-Manufacturing and processing	.669	1.822
D-Handicarft and cottage	-.743	-2.273
D-Service	-.240	-.936

6. Conclusions and Implications

The enterprises in the BASIS study region are generally characterized by low productivity and stagnation. With widespread poverty and few productive activities in the area, employment is sought through engagement in micro-enterprises. The capital requirement is very small and the technology is minimal in most cases. Demand for output and services are also very limited as the bulk of the hinterland population is dependent on agriculture and suffers from very low levels of productivity and high degrees of risk and uncertainty.

Export to other regions is very limited. As a result, too many operators chase very limited low-income markets, which create little incentive for business expansion. The primary aim of most micro-enterprise owners is to maintain a minimal level of operation, with little business investment and risk-taking ventures. Access to financial services is limited and partnership and networking are unknown.

The major determinant of performance is working capital. Financial resource is a critical limiting factor. Because of the expanded market opportunities, larger urban centers are associated with more sales. Access to mass media information, attempts to save income, and to obtain formal licenses appear to encourage better performance for business operators. However, the overall

business environment is so weak in the region that human capital and physical infrastructure do not seem to have significant impacts.

Broader implications of the findings

A lack of effective linkages with the rural sector is one of the major features of the enterprises in the South Wollo and Oromiya zones. At present, small towns are not a source of farm input or new technology for the countryside. Hence, any attempt to develop the local economy cannot be successful unless capacity is created in the enterprises to provide services for transforming rural areas, and improving the productivity of small farmers. Sustainable development requires traders, transporters and processors to closely link and network with producers of crop, livestock, forest products, and other economic products. This has not happened in the region.

A lack of purchasing power in the area also is cited by most enterprises as a major bottleneck to business expansion. The main customers of micro-enterprises in small towns are local farmers and local town dwellers. Any improvements in the agriculture sector would thus enhance local demand for goods and services. There must also be serious thought to raising the incomes of town dwellers either through subsidies or government investment activities.

Expanding urban centers create opportunities for small enterprises to grow and innovate. Government policies should thus encourage, not discourage, the growth of small towns if the goal of rapid local and regional/rural development is to be achieved. It should also be noted that a growing urban center is necessary to fully absorb surplus from rural areas.

Micro enterprises in small towns need vigorous government support to reverse the stagnation and to promote dynamic business growth. In this regard, an ad-hoc, piece meal approach will not be helpful. A comprehensive package of support is necessary to address the diverse and complex problems of the sector. Undoubtedly, adequate provision of credit should be the key component of a business development package. Means must be sought to ensure that small enterprises benefit from the services of formal commercial banks, specialized banks and micro-finance institutions. Among other critical components to enhance the business environment are improved extension services and information provision, consultancy, training as well as research and prototype development.

Government support in other countries often include the establishment of industrial zones, commercial zones and other common facility centers to ease the problem of inadequate (or absent) business premises and to introduce new technologies and ideas. The incubators (business start-up premises) could also involve information and communication technologies to widen market opportunities. The recent initiative by the Federal government to introduce such an approach to enterprise development immediately should be taken up by local and regional governments.

A major prerequisite for the introduction of micro-enterprise support programs is improved institutional capacity at local level. The government has created several institutions, including Trade and Industry Bureaus and an Agency for Micro and Small Enterprise Development, to implement its support programs. Nonetheless, these and other similar institutions and their services are non-existent at local levels. Policies and support measures announced at Federal or regional level often fail to reach the intended targets due to missing institutional links in local areas and towns.

Lack of an enabling legal and regulatory framework has given rise to high transaction costs and uncertainties in the market place. One major outcome of this is the absence of partnerships and networking among business operators. Enterprises prefer to operate individually and incur high costs, even though the advantages of scale economies resulting from partnership and cooperation are recognized by most operators.

Business owners in the survey towns have no institutions to defend their interest or voice their concerns. There are no forums for discussing development issues among government agencies and the private sector in the small towns. Business people often feel excluded from the development process and some of them point out that the overall business environment is not significantly different from the old regime of pre-1991.

Finally, a regional approach to the development of small towns is needed. Although sectoral approaches could be pursed independently to develop micro enterprises, agriculture, and infrastructure, a regional, multi-sectoral approach has a greater chance of success.

Annex A
Notes on Workshop Presentations and Discussion

These are notes were taken by Priscilla Stone and Mesfin Tadesse during the workshop. Very short summaries of the presentations are provided, followed by a summary of the question/answer session. Peter Little edited these notes and apologizes in advance for any mistakes in the transcriptions.

DAY ONE
Session One

Presentation by Workneh Negatu - Methodology and Study areas of the BASIS/IDR Household Study
Household study started in May/June 2000 and is now in the 7th round of data collection. The major objective is to trace changes in food stocks and assets and relate these changes to the physical setting and the general socioeconomic situation. The study area is in South Wollo and Oromiya zones of the Amhara region and includes a range of agroecological conditions and altitudes. These also correspond to a range of meher/belg growing areas. Some farmers have started to test meher production in traditionally belg areas like Gerado of South Wollo. Within each woreda two kebeles were selected; one close to the Woreda town and one more distant.

The research started with community studies in 1999 but did not include Jamma wereda. Jamma was added because it is considered to have relatively more potential in agriculture. Altitude, rainfall and temperature data were available from meteorological stations: high temperatures in Bati, rainfall is better in Dessie Zuria and Legambo. Altitude is measured by taking an average for each PA based on individual household GPS siting.

Random selection of households but based on records of landholders as well as landless households. The average proportion of female heads is 24%, the highest is 33% in Legambo, and the lowest in Bati is 14%. Some relative few drop-outs occurred across the 6 rounds. Some households moved and migrated. Sample size down to 421. Only lost 27 households in all.

Mike Roth on Food Self-Sufficiency or Income Security: Managing Labor and Assets - with Tewodaj Mogues.
The study should resist from over-generalizing - for example, drought hits very differentially. June 2000 during first round of data collection conditions were quite poor throughout the region. But in the latter part of 2000 some communities doing better. Legambo is high altitude producing area but confounded by mild drought.

On hunger and famine one major theory of Norman Borlag says that if you want to get out of hunger, invest in agriculture and you will grow yourself out of the problem. Others like Amartya Sen say that entitlements like 'Food-for-Work' are important parts of food security.

The analysis came up with quadrants to differentiate households: some households have low capacity to grow sufficient food and low ability to purchase food; some households can't produce food but have high income; some households have high capacity to grow food but low ability to purchase food; and some have high production and high income.

Food self-sufficiency in these 4 quartiles: Your ability to produce food is one of the single most important determinants of food security. There is an income effect that shows that even though

households produce enough food, additional income enhances food security status through food purchases. Income effect is more important for lower strata than the higher strata. Most households get food aid and amounts tend to be quite sizeable. Poorest category receives the most food aid, but the best-off households get the next biggest amount of food aid.

Low food security households purchase food; high food security households sell food.

Landlessness: female households tend to have small farm sizes (34.9% in bottom quartile, 35.2 in lower middle, 15.1 in upper middle, and 7.5 in upper quartile). Those with the smallest farm sizes are more likely to sharecrop out. Somewhat counterintuitive since expect large households to have excess land in most of the world. Overall farm sizes in Ethiopia have reached a minimum and even the largest households need extra land and can get it from the smallest landholders who lack other assets (like oxen, or labor) to cultivate.

Fair degree of constancy in off-farm income across these various household categories.

Lorenz curve - asset inequality. Inequality is more extreme in livestock of ownership. 80% of the households hold 60% of the land. There is fairly equal land ownership in broader terms. Livestock: 30% of the community have no livestock holdings at all. Also coming out of a period when there was drought that would affect livestock ownership. Not owning your own oxen may mean you plough at less than ideal times and you may have to sharecrop out your land.

Inequality of income: 70% of the poorest households in term of food production produce only 30% of the food. 30% of the households produce 70% of the food. So one is dealing with some inequality. Food aid has done a considerable amount to lessen food inequality and doing a relatively good job in terms of narrowing the gap, although not reducing it completely.

Consumption dynamics: Out of 8 kebeles in our study, only two are standouts in terms of food consumption. Based on a figure of 2,100 calories per adult per day, only two kebele have stayed above that level: Chachato and Kamme. Two kebeles consistently under-preform: Tachakesta, and Temu. Both of these are in highland and upper highland conditions but don't grow enough, acquire enough food aid, or obtain enough off farm income to get enough food. A lot of kebeles are pretty much on that line.

Regression estimation of food security: Dependent variable is food consumption measured in kg . What are the principal determinants of food security in our area? Oxen ownership makes you food secure. Permanent land holdings are a key determinant. But those who can lease in land are okay for food security. Household size: the more people you have, the greater access to food security you have. Additional labor enters the non-farm sector and enhances food security. Food aid is significant but not overwhelmingly so. Distance from market has a negative effect on food security.

Workneh Negatu: Agricultural Technology and food production and security in South Wollo and Oromia Zones, Amhara Region

Presentation is based on 3rd round data (Dec. 2000-June 2001), which was a low production period. Belg failed and meher season was very good.

Bati wereda stands out in several respects:

--education is relatively higher there but overall in study region only 22% of household heads are literate.

--Bati has higher land size but land quality is poor and Bati has more livestock.
--Subsistence pressure (measured in adult equivalent per ha of cultivated land) is high in Bati.
--Bati has relatively high stored food stock. Jamma had best harvests in that period (86% of the total food availability). Food aid is important in Bati and food purchases is high in Bati.
Generally food sources are diverse and vary by kebele.

Food status: based on food consumption for this period (food crops) - again defined by 2100 calories for these 183 days: Jamma is very food insecure (93.5%) during that period, but Batti fairly secure (6.5%). Overall 67.5% of households were food insecure during June 2000-June 2001. Ironically,
Bati is a poor zone and Jamma is a good one.

35.37% of male headed households are food secure, while 22.68% of female headed households are food secure. Those involved in more off-farm activities are more food secure, which expalisn why Batti fared better than other areas. Those leased out land also are more food insecure, while those with 2 or more oxen are more food secure. In terms of food security important variables include the land cultivated, land holding type, and off-farm cash income. They all matter in food security group

Use of technological inputs: Jamma more likely to use improved seed and fertilizer than other areas. Bati uses manure, but no households use herbicides.

Production capacity quartiles: Upper quartiles more likely to use fertilizer, urea, improved seeds. Off-farm income highest in lower middle quartile. Cultivated area, oxen ownership, livestock assets all are concentrated in upper quartile.

Summary and Implications:
Food security: Land holding and cultivated land, off-farm cash income, farm cash income, livestock assets, oxen availability are all important. Government needs to encourage markets so farmers benefit from intensification and diversification.

Question period:

Question: Does Workneh' study have a missing piece of data on the effects of input use? Jamma may be using lots of inputs but this does not necessarily mean that the yields are increasing. Why are they food insecure when they use these inputs?

Answer: They are doing better partly because of input use, but we are still unsure about their effects and they also use less fertilizer than recommended. This period had frost which may also have reduced positive effects of inputs.

Question: Roth reports nutritional adequacy in terms of adult equivalents per day but what about food consumption per capita within a household?

Answer: The data is reported in terms of kilograms per household - labor is having a sizeable effect on food security probably through non-farm income.

Question: The regressions presented by Roth do not show any significance for female headedness even though these households are deprived in terms of land and livestock.

Answer: It is puzzling. One answer is simultaneity - they have limited land and oxen and once you account for that, nothing is left for gender to pick up. But this does not completely explain it. They have little income but their main conduit for food is through food purchases. So what are we missing?

Question: Workneh presents conflicting data about Jamma: Jamma is high potential but food insecure?

Question**:** What are the sources of income for high food purchases in Bati?

Answer: They receive remittances, and are also involved in trading activities.

Question: Is there any evidence of income investment and savings?

Answer: This is very limited but there has also not been much analysis yet.

Question: Does food aid positively contribute to food security?

Answer: Food aid is making the community more vulnerable because they are losing their coping mechanisms and they are degraded by the way it is administered. It is not a long term solution and may have negative psychological effects, but in the short term very important to help people survive. The big question is how to get them off reliance on food aid in the long-term. Roth on food aid: Can you target particular households for food aid? The information costs are high to identify the truly needy households. In the short run, in times of stress, better to give food aid to everyone. Can make an effort to favor the really poor but may not be practical.

Question: irrespective of income category, it seems that food aid is being given almost at same level. Yet you say that it is helping reduce inequality?

Answer: Tewodaj says age of household head has small negative relationship to food security. Somewhat counterintuitive since expect older household heads to be more prosperous. Also in that regression, positive effect of being in Chachato on food security even though have already accounted for many possible sources of these effects. Why?

Question: Land quality is not included along with land size?

Answer: The analysis did not take that into account.

Question: What are the policy implications of the finding that land size has a positive relationship to food security given the government's efforts regarding land redistribution?

Answer: Workneh answers that even our best households are not land abundant and they gain access to additional land through leasing and sharecropping in land from households which lack capital for inputs, oxen or labor. So the land cycles back to the larger households in any event and further redistribution would be at conflict with what is happening. He feels we need a land rental policy that protects the land owner and renter. He also thinks we need to consider commercialization of land.

Question: If Bati is an "achiever" what do you think accounts for this? It is also a main recipient of food aid? What are the lessons?

Answer: Workneh replies that opportunities may be in many forms including access to non-farm employment, good infrastructure, and markets and more livestock. Bati shows the importance of diversification and nonfarm income. Its proximity to Kombolcha (an industrial town) also contributes to its relative success as well as the existence of remittances from outside the country, such as from Djibouti and other Arab countries.

Question: What is the long-term perspective on South Wollo? We might expect a downward spiral with increasing population pressure, smaller landholdings, and use of fewer inputs, and, therefore, a weaker production capacity. So people who are food secure today, will be food insecure tomorrow. You don't see population pressure leading to intensification as you do in other areas. But we cannot say need that we need more oxen, because the potential is so low and strong overall effects on degradation. In these areas, fertilizers may cost them more than it contributes (repaying fertilizer loans has overall negative effects).

Answer: Roth says the likelihood is that development probably cannot work in South Wollo depending solely on agriculture. Resettlement? Probably won't improve their livelihoods either. What can you do? Keep them on food aid bandwagon, but that is not sustainable. Need to move out of the idea that landholding is the way to produce surplus. Future probably rests in non-farm but are those opportunities really there?

Little adds that terms like "food secure" and "well off" are very relative - even in Jamma, the average landholdings is still only 1 ha. Overall, this system is very land constrained and those who get food aid and off-farm income are more food secure (we define food secure to include food aid). But that leads to the dependency question: How much does food aid really affect their decision making? Since it is undependable and comes late, farmers continue to purchase and produce food in any event. Food security: how to measure? Take out food aid, but what if some food aid is traded and sold.

Question for Workneh: Why did his paper focus on a particular period?

Answer: Because it was a particularly bad period and he wants to be able to compare this to relatively better off periods later on. Oxen data in regression: 50% of our hh do not own any oxen. 56% to 46% own no oxen so people have been investing in oxen.

Question: Does the project have access to any other data besides recall?
Answer: All the data in the household survey are from the questionnaires. We did no direct physical measurement of crop output, etc.

Question: What are the recommendations for regional policy makers?

Answer Roth answers that this is the big question. We are still dealing with a highly administrated economy, partly due to drought and food aid having a distortion effect on economy. The increases in land transactions and markets may be partly affected by gov't policy and control, but will also reflect things like the frequency of capital investments (like roads). Workneh adds that we also aim to strengthen policy-research dialogue and linkages. Land issue: need to look closely at transactions.

Session Two

Tafesse Kassa, Food Insecurity in Amhara Region

A 2002 survey of 56 woredas was undertaken with a very large sample size - 34000 hh.
A summary of the findings:
--more than 45% of the rural population in Ethiopia under absolute poverty
--25% of the poor in Ethiopia live in Amhara Region
--2.45 million out of 7 million were considered vulnerable in 1996
--average hh size is 4.7 and 45.1% of members are under 15.
--major occupations: farming 28.2%, domestic work is 24%
--13 days in a month that are non-working holidays
- -In 2002 has living condition improved? Worsened is the most common response. Only 16% says it improved.
--people considered land and oxen as important criteria for classifying hh wealth
--38.7% were poor, 22.7% were destitute
--most vulnerable groups are those who are landless, elderly and sick, small and less fertile land holders, oxenless (are not considered as vulnerable as those without land), female headed
--other poverty related indicators: Illiteracy rate of 70%, female illiteracy rate of 79.2%, 44.2 % in enrollment data (50% for males, 38,1% of the girls are enrolled in school)
--stunting in Ethiopia is very high. Amhara region is worse than Ethiopia in general. True for body wasting as well
--food shortage - worst in dega (highland) areas.
--number of food deficit years - 5 years say about 15%
--average number of food shortage months ranged from 5-11
--only 31.4% can cover 9 months of food needs
--factors that contribute to low food security capacity - low fertility land, lots of land fragmentation (29.1% have three plots); only 4.7% involved in irrigation
--92.3% use oxen to plough, but 60.3% have only one ox
--main cause of food shortage is natural hazards (41%), erratic rainfall (29.5%), shortage of labor (3.9%), degradation of land (5.9%) shortage of ploughing animal (6%)
--coping mechanisms: 45.2% say sale of animals, 18.2 % grain donations, 14.8 % credit, 4.1 % food for work, and 2.5 % temporary migration.
-- food intake frequency - in most cases eat meat only during holidays;
In terms of extension: most interest is in cereal and pulses; about 27 % interested in homestead forest package; and 26 % interested in tree seedlings
--female hh selecting homestead forest over other choices (like seedling, forest)
--water harvesting - spring development and pedal pumps were preferred as package
--most hhs preferred animal package - sheep breeding package especially popular.
--Conclusions: food shortage across both rainfall sufficient as well as moisture deficient woredas

Abera Tekla Mariam - Socio-economic Situations of the Amhara region
Summary:
--South Wollo has 18 woredas overall
--there is relative gender balance
--89% is rural
--about 26% of Ethiopians live in Amhara region
--high dependency ratio - 44% under 15
--population growth rate is 2.96%
--moisture deficit areas have shallow soils
--overall, a lot of irrigation potential for the region

--1/3 of national livestock population in Amhara
--in South Wollo mostly cattle (9 million), but 3 million sheep and other livestock.
-food insecurity - population pressure (has doubled in one generation), absence of markets, poor soils

Question**:** Are there grain donations?

Answer: There are a variety of food sources including food aid, gifts, etc.

Question: Is lack of oxen the key constraint?

Answer: Data are unclear on this point but still ploughing animals doesn't' just mean oxen. Other animals like horses are used for ploughing in 2-3 woredas. Most vulnerable people have no oxen, 60% have a single oxen, but 93% use oxen for ploughing so what is going on? Seems contradictory?

Question: How important is land degradation?

Answer: At regional level we need more analysis.

The performance of Micro-Enterprises in Small towns - Tegegne Gebre-Egziabher and Mulat Demeke

Summary of study findings:
--Ethiopia is one of the least urbanized countries in Africa - only 15%.
--most urban centers are small towns where there is a concentration of very poor households and limited rural-urban linkages.
--6 small town were surveyed, of which 4 are in BASIS study region; 50-60 enterprises in different categories were covered.
--33% of the businesses in region are services, while 27% in food and drink
-38% do business in their home, 18% in traditional markets, 10% road side, 18% mobile
--74% use family labor
-- no other alternatives in area for poor households: call these **survival entrepreneurs** engaged in poverty sharing activities.
--most of the inputs are local (50%) regional (44%)
--they say major constraints for micro-enterprises are access to land, electricity, telecommunications
--growth constraints - lack of capital (54%), lack of demand (23%)
--business incomes are going down since too many operators and weak purchasing power of customers
--about 2/3 use income for home consumption
--some businesses are decapitalizing
--Female operators do not compare poorly as compared to male counterparts. This contrasts with rural areas where female farmers do worse
--Bati residents are better - bigger and on major Djibouti/Assab road
--businesses are very small, unprofitable businesses will not be able to serve as engines of growth
--micro-enterprises are source of last resort employment
--no effective strategy in place to develop this sector

Sam Benin, Factors Affecting Soil Fertility Management in Amhara Region

Summary of study findings:
--soil fertility declining in much of East and West Africa
--increasing population pressure leads to continuous cultivation - declining fallows, low use of inorganic fertilizers.
--organic sources of fertilizers are only recycling and can only act as a buffer - cannot actually increase fertility. For example, legumes are nitrogen fixing but need to be planted over a number of years to help plus most of the fertilizer is in the bean which is eaten.
--highlands (>1500 masl)
--most of the data in study is for 1999
--overall, farmers don't really perceive of much reduction in fertility
--main practices to manage soil fertility include using crop residues and crop rotation
--increased use of inorganic fertilizer is substantial
--putting more into the plots that they perceive are fertile
--farmers not actually doing much rotation - main season usually for cereal production
- not much sign that population density is causing intensification a la Boserup theory, in terms of using inorganic fertilizer

Question: What makes the most sense - using crop residue to feed cattle and then produce manure or ploughing in the crop residue into the soil?

Answer: Not much innovation by farmers and not much perception of soil degradation as problem

Question: What is role of Credit? Any insurance in the event of failure?

Answer: No

Yigremew Adal - Land Tenure Issues in South Wollo and Oromiya Zones

Summary of paper:
-- presentation based on first round of the BASIS survey
--growing problem of landlessness despite redistribution programs- also problems of inequities. In parts of Showa, some farmers own 10-12 ha. while others are landless
--continuous diminution of land size - down to about 1 ha average - smaller land size has depressing effect on adoption of agricultural technology like fertilizer
--tenure insecurity- growing land disputes
--new land tenure policies are allowing some absenteeism without losing title to land. Used to be that you had to reside on land to keep hold of it. Now allowing some rental.
--women disadvantaged in land tenure system because of cultural values, gender bias, lack of access to inputs, low membership in PA associations
--case study: South Wollo and Oromiya - literature says South Wollo has smallest size of landholdings. South Wollo (SW) has average of less than 0.85 ha. Other parts of Ethiopia have bigger average landholdings, and in SW 19% are landless
--In SW percentage distributing of holding size (ha) - overall 62% own 1 ha or less. Only 3.3% own more than 2. This is not that different from national average
-how do people acquire land? 80% from govt redistribution. Parents (mother, father) inheritance about 16.3%. The redistribution may include land they already held but was reevaluated in the redistribution.
Male and female heads. Females have .69 ha; males have .89 ha. on average

--in recent land redistribution more attention paid to women but 3 years later - women go on losing land while men go on accumulating land. So redistribution may not guarantee sustainable access
--serious concern in literature about land fragmentation - average of 3 different plots. Ygremew doesn't think this is a big problem - there are some advantages.
--In SW average distance to parcels - less than 30 minutes walk. Average parcel number is 2.74.
--land transactions - overall 6.7% rental, 92.3% sharecropping, .9% gift. Of those parcels transferred virtually all are sharecropped. Nowadays the value of the land to be sharecropped out has increased. Now 50/50 ratio for sharecropping benefits is common. Also crop residues are shared. Also some cash advance is required - total 17.8% but highest in Dessie Zuria is 25.5%. Women not able to contribute inputs (if 50/50 share, you are expected to contribute 50% fertilizer of labor but they cannot)
--who to transact with in sharecropping? Majority with family or kin (64.4%), 15% with neighbors and friends. Outsiders are 20%. Fear redistribution if sharecrop to outsiders, so more likely to transact with kin.
--soil fertility in SW - half are semi-fertile . 1/3 are fertile. 17% unfertile. 2/3 of the land is unfertile or semi-fertile
-land management practices in SW and Oromiya (o). Overall 8.7% irrigated but only in Dessie Zuria (23.6%). 10% manure applied (mostly in Bati). In some areas, stone bunds and soil bunds can be helpful
-constraints to soil conversation practice. Labor is often mentioned as a problem: 42.7% of households. Seasonally area is short of labor. 15.5% say they lack money.

Question: Is land tenure a problem for investment in soil fertility?

Answer: Security does not necessarily affect investment. Short-term investments will still be made like fertilizer use. If people have the means, they will buy fertilizer on land they rent in. But in long-term, some kinds of investments, like tree planting, helps reaffirm claim to land.

Question: What about landlessness and redistribution?

Answer: If you stop land redistribution, you will still see fragmentation because of inheritance. Not bad in itself and it will continue one way or another. Also fragmentation is not necessarily associated with land insecurity. People support redistribution but argue about how and when.

Question: What about rentals?

Answer: Within the existing state policy of land ownership, we must liberalize land transactions. People are doing it "ad hoc" and hidden. Policy does not allow multi-year rentals in many years.

Question: Sharecropping-- Why not hire labor instead?

Answer: Sharecrop out because of multiple reasons not just labor - lack of seeds, fertilizer, oxen, etc. Hiring labor is expense and how will you afford the other inputs? There is a very small and seasonal labor market. We need more qualitative information since questionnaire will not get at sensitive issues like land tenure.

Peter Little: From Poor to Poor: Cycles of Poverty and Drought Recovery in South Wollo

Summary of Paper:

--farmers are either coping or recovering from drought. This paper focuses on recovery period. May be recovering to pre-drought situation but not necessarily better off or better able to withstand the next drought
--what is a viable production unit? 2 oxen is the ideal for plough agriculture
--labor viability - average household size is small 5. Non-farm option in not good at present
--land sufficiency - really need 1 ha or more for food self-sufficiency. Many farmers do not have this amount of land.
--livestock - poorest 25% hh had no livestock. Second quartile owned .85 TLU. Third quartile is 2.79, 4th quartile is 7.29 TLU. Kolla (lowland) areas have more livestock
--in June 2000, the study began during a recovery period. 1999 was much worse. Already seeing some upswing in recovery.
--a 1998 IDR/SIDA report found average oxen of .98 per household. In June 2000, most hh well below one oxen (as of 1997, Ethiopia was exporting grain to Kenya).
--by December 2001, see some substantial improvement in asset recovery. By March 2002, those households owning no oxen had dropped from 56.9 to 47%. 22% own, an improvement of 30% since June 2000.
--land viability - 1 ha is minimum threshold. In June 2000, no area has even half of the household had 1 ha. This is amount of cultivated land (includes 'sharecropped in' land). Average cultivated land in March 2002 data is average of over 1 ha.
-nonfarm - work off farm (mainly food-for-work) drop off as conditions recover. By March 2002, only 32% getting food for work. Trading and self-employment - in initial recovery period get a lot of petty trading, but by March 2002 only 20% (down from 33%) involved in petty trading
--remittances started to increase - people went out during the drought and remittances started to come in ----drought recovery cycle - who achieved pre-drought livestock holdings of 3.27 TLU: only 55% of hh in Chachato in 2000 reached that level, and only 9% in Temu. But by 2001, Temu has 36% of hhs have reached that level. And now in Chachatu up to 71% have achieved this level. Richest areas had decreased in oxen - maybe a ceiling on how many oxen makes economic sense because of feed and land costs..
--since June 2000, all areas recovering animal assets.
--what role has agriculture played in allowing asset recovery? Look at food sales. Going up during this period. Especially in Jamma area. So agriculture has contributed to herd asset recovery
--different pattern in goats and sheep - much faster herd reproduction. Early focus on small stock because they reproduce faster than other animals. Households depend mainly on natural reproduction, but market purchases and loans also are important.
--initially, richest households selling oxen. Maybe taking advantage of market when livestock prices are increasing. Later on, households are converting small stock to oxen
--but have households recovered enough to a level where they can survive the next drought? Many have not!
--households do use the market - both buying and selling of animals. These figures are pretty high relatively speaking. Borrowing mainly important for the very poor.
--role of non-farm income becomes very important - what role has food aid played in this period? The areas that received the most food aid (Chachato and Kamme) in July 2001-Dec. 2001 these are also the highest livestock owning area. Among the poor, food aid has played a role in recovery. From June 2000- Dec. 20001, the TLU has grown by 40.5% and by Dec. 2002 has grown by 48.5%, and very high recovery for very poor but they started at very low levels of asset ownership. Rates of recovery seem to be dropping off since March 2002.
-poorest and wealthiest animal asset categories have shown the largest recovery increases.
-- recovery is not completely correlated recovery with initial wealth holdings
--credit drops off as recovery begins (all forms)

--Conclusions: asset protection and recovery should be as much a focus as drought recovery
-strategic use of food aid - timing more than targeting
-the market: is very important. Closer you are to town, better your recovery and food security.
- need to open up non-farm employment opportunities. Not full time farmers in area.

Question: Food Aid: 1980s was the beginning of getting on the food aid treadmill. Clearly it has made communities more vulnerable in some ways to the next drought.

Answer: During emergencies, food aid is definitely needed for the most vulnerable. Has it broken down traditional mechanisms of food sharing? Maybe. Would the moral economy take over? This is hard to say. Food aid comes too late and stays around too long. International community that provides food aid is as volatile as weather.

Question: Why not move out South Wollo?

Answer: Maybe they stay because of access to food aid and land, and no malaria in hihglands.

Question: What kinds of innovations in coping takes place?

Answer: There is a lot more innovation during coping period than recovery. All are small-scale and rebuilding period is conservative. Need a minimum subsistence level to allow innovation. R2D program of USAID will guarantee food for 3 years and try to see what kinds of innovation happen.

Day One Summary of Discussion period (summarized by Priscilla Stone):

Some of the discussion focused on particular areas within the study and why they outperformed or under performed others. Bati, for instance, is described as an "achiever" yet is also a main recipient of food aid. What are the lessons? Workneh replied that opportunities may come in many forms including access to non-farm employment, good infrastructure, and access to markets as well as more livestock ownership. Its proximity to Kombolcha (an industrial town) also contributes to its relative success, as well as the contribution made by remittances from outside the country such as Djibouti and other Arab countries. Bati shows the importance of diversification and nonfarm income.

The discussion questioned the role of food aid in food security. Does food aid positively contribute to food security? Several in the audience felt that food aid is making these communities more vulnerable because they are losing their coping mechanisms and they are degraded by the way it is administered. It is not a long term solution and may have negative psychological effects, but in the short term it can be very important to help people survive. The big question is how to get them off reliance on food aid in the long-term. Roth asked whether you can target particular households for food aid? He noted that the information costs are high to identify the truly needy households. In the short run, in times of stress, it is better to give food aid to everyone. You can make an effort to favor the really poor but may not be practical. A questioner noted that irrespective of income category it seems that food aid is pretty constant. Yet we say that it is helping reduce inequality?

The regression analyses presented by Roth and Mogues included some puzzles. They do not show any significance for the fact that households are headed by women, for example, even though these households are deprived in terms of land and livestock. Roth agreed that this is

puzzling and suggested that one answer is simultaneity - female heads of household have limited land and oxen and once you account for that, nothing is left for gender to pick up. But this does not completely explain it. They have little income but their main conduit for food is through food purchases. So what are we missing? Also puzzling, notes Mogues, is that the age of the household head has a small negative relationship to food security. This is somewhat counterintuitive since we would expect older household heads to be more prosperous. Also they noticed a positive effect of being in Chachato on food security even though they had already accounted for many possible sources of these effects. They are not sure why this is the case.

Discussion also focused on land redistribution and its future. A questioner asked what are the policy implications of the finding that land size has a positive relationship to food security given the government's efforts regarding land redistribution? Workneh answered that even our best households are not land abundant and they gain access to additional land through leasing and sharecropping in land from households which lack capital for inputs, oxen or labor. So the land cycles back to the larger households in any event and further redistribution would be at conflict with what is happening. He feels we need a land rental policy that protects the land owner and renter. He also thinks we need to consider commercialization of land. The data for this project includes only land size not quality, which may be important as well.

Several questions asked about the long-term perspective on South Wollo. We might expect a downward spiral with increasing population pressure, smaller land holdings, decreasing use of inputs, leading to a weaker production capacity. So people who are food secure today, will be food insecure tomorrow. You don't see population pressure leading to intensification as you do in other areas. But you cannot say they need more oxen, because the potential is so low, given overall degradation. In these areas, fertilizers may cost them more than it contributes (repaying fertilizer loans has overall negative effects). Roth answered that the these households cannot continue depending solely on agriculture. Resettlement probably won't improve their livelihoods either. You can keep them on the food aid bandwagon but that is not sustainable. In the end, we will need to move out of the idea that landholding is the way to produce surplus. The future probably rests in non-farm but are those opportunities really there? There is very limited evidence of income investment and savings but there has also not been much analysis yet.

Little adds that terms like "food secure" and "well off" are very relative - even in Jamma, the average land holdings is still only 1 ha. Overall, this system is very land constrained and those who get food aid and off-farm income are more food secure (we define food secure to include food aid - since some food aid is traded and sold it cannot be removed from the measure). But that leads to the dependency question and whether food aid encourages dependency. How much does food aid really affect their decision making? Since it is undependable and often comes late, they continue to purchase and produce food in any event so the effect may be weak.

Also questions were raised about the policy implications of this work for regional policy makers. Roth remarks that this is the big question. We are still dealing with a highly administrated economy, partly due to drought and food aid having a distorting effect on the economy. The increases in land transactions, which need to be examined closely, and markets may be partly affected by government policy and control, but will also reflect things like the frequency of capital investments (like roads). Workneh adds that we also aim to strengthen policy-research dialogue and linkages.

Some questions were raised about the specifics of the research design, analysis and data collection. It was noted that all the data for these analyses are drawn from the questionnaires. We did not do direct physical measurement of crop output, etc. It was also noted that Workneh's

paper focuses on a particular period. He answered that he did this deliberately since it was a particularly bad period and he wants to be able to compare this to relatively better off periods that occurred later on. There was also a discussion about the effects of input use on yields. It is unclear whether the use of fertilizer, in Jamma for instance, is increasing yields given questions about whether they are using the recommended amount of fertilizer, whether the fertilizer does indeed improve yields, and the fact that frost may have reduced the positive effects of fertilizer use during the period under study. There were also questions about the way nutritional adequacy was being measured. It is clear that non-farm income is positively affecting food security but the way this is measured is not straightforward

DAY TWO (Morning Only)

General Discussion on Research-Development/policy linkage: experiences and future outlook

-On Policy: given the decentralization process where the woreda has the most power now, should we bother with region and zone or should we be targeting the woreda? Region sets policy but woredas implement.

-On land tenure: Only thing they cannot do is sell land. Can rent for as long as 25 years (based on life expectancy), can leave for his/her children, and can plant trees. In settlement area, given certificates of users rights as well as land ownership. Even private investors, can rent land. Make larger plots by renting from a number of landowners. No more redistribution.

- On Drought recovery: Peter's findings very similar to Chris Udry's results from West Africa where poorer households sell off assets to richer hhs. Need more analysis to indicate what rile of food aid is in asset recovery, and what role agriculture plays in this.

--On formation of regional policy group for the BASIS study: about 90 minute discussion of how a regional policy group for study could be formed. Agreement is reached and group is formed and Rural Development Bureau takes the lead. IDR researchers will follow up with additional meetings in Bahir Dar.

Annex B
Workshop on BASIS /IDR Research Programme in Eastern Amhara Region, Ethiopia
Bahirdar, Amhara Regional State
17-18 June, 2003
Papyrus Hotel, Bahirdar

Organized by: BASIS Project and Institute of Development Reearch (IDR), Addis Ababa University

Objective

The objective of the Workshop is to discuss the preliminary results of the BASIS/IDR (Institute for Development Research) research program in South Wollo and Oromia zones in Amhara Region and to exchange experiences and information on food security situation in the Region. The Broadening Access and Strengthening Input Market Systems (BASIS) project is an applied research program that works in several countries around the world and has been engaged in policy-oriented studies in the South Wollo and Oromia zones since 1999. Discussion also will focus on different ways of strengthening research and development/policy linkages between the BASIS/IDR project and policy makers and institutions at the regional level.

Program

Day One: 17 June 2003

8: 30 Am - 9:00 Am: Registration

9:00 - 9:10 Am: Welcoming and Opening Address, **Dr. Workneh Negatu**, Director, IDR

9:10- 9:20 Am: Statement on BASIS Project, **Prof. Peter Little**, Leader, BASIS Horn of Africa Research Program and University of Kentucky

9:20- 9:30 Am: Opening Address, **Ato Melese Tilahun**, Head, Rural Development Bureau, Amhara Region

9:30 - 10:00 Am: Tea/Coffee Break

Session I: Chair, Dr. Abduhamid Bedri Kello, IDR

10:00 - 10:30Am: Methodology and Study areas of the BASIS/.IDR Household Study, **Workneh Negatu**, IDR

10:20-10:50 Am: Food Self-sufficiency or Income Security: Managing Labor and Assets, **Tewodaj Mogues and Michael Roth**, BASIS and the University of Wisconsin

10:50 - 11:30 Am: Cropping Patterns, Technology, and Food Production and Security in South Wollo and Oromia Zones, Amhara Region, **Workneh Negatu**, IDR

11:30 12:00 Am: Discussion

12:00 -12:30 Pm: Food Security Situation in the Amhara Region, **Tafesse Kassa**, Food Security Program, Amhara National Regional State

12:30- 14:00: Lunch break

Session II: Chair, Dr. Getnet Alemu, IDR

14:00-14:30: Socioeconomic Situation in Amhara Region, Dr. **Abera Tekle-Mariam,** Rural Development Bureau of Amhara National Regional State

14:30-14:50 (Briefing on the Current Food Crisis in South Wollo Zone), BASIS-RDLC Representative

14:50-15:10 (Briefing on the Current Food Crisis in Oromia Zone), BASIS-RDLC Representative

15:10 -15:40 Discussion

15:40 - 16:00: Tea/Coffee

16:00 - 16:30: Gender Dynamics and Household Drought Coping and Recovery Strategies in South Wollo and Oromiya Zones, Ethiopia,.**Priscilla Stone**, BASIS and Washington University

16:30 - 17:00: Social and Economic Mechanisms for Drought Recovery in South Wollo, Ethiopia: Lessons from the 1999-2000 Disaster, **Peter Little**, BASIS and University of Kentucky

17:00 - 17:30: Discussion

Day Two: 18 June 2003

Session III: Chair, Dr. Gete Zeleke, ARARI

8:30 -9:00 Am: Factors Affecting Soil Fertility Management in Amhara Region, **Sam Benin**, International Livestock Research Institute

9:00-9:30 Land Tenure and Land Transaction in South Wollo, **Yigremew Adal**, IDR

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9:30- 10:00Am: Performance of Micro Enterprises in Small Urban Centers of South Wollo and Oromia Zones in Amhara Region , **Tegegne Gebre-Egziabher** and **Mulat Demeke**, Addis Ababa University

10:00-10:30 Am Discussion

10:30- 11:00: Tea/coffee break

Session IV: Chair, Workneh Negatu, IDR

11:00-12:30 Pm: General Discussion on Research-Development/Policy Linkages: Experiences and Future Outlook

12:30: 12:40: Closing remarks, **Ato Mulugeta Seid**, Head, Food Security Program Coordination Office, Amhara National Regional State

Lunch: 12:45-14:00

17:00 - 19:00: RECEPTION at PAPYRUS HOTEL

Annex C
Workshop Participant List

Sr. No.	Name	Institution
1	Alemu Asfaw	Southern Wollo Rural Development Office
2	Metselal Abraha	USAID/ETHIOPIA
3	Workneh Negatu	IDR/AAU, ETHIOPIA
4	Yigremew Adal	IDR/AAU, ETHIOPIA
5	Getnet Alemu	IDR/AAU, ETHIOPIA
6	Abdulhamid Bedri	IDR/AAU, ETHIOPIA
7	Peter Little	University Of Kentucky/BASIS, USA
8	Terecha Demie	Oromia Zone Administration Office.
9	Belay Demisse	USAID/ETHIOPIA
10	Prisilla Store	Washington University/BASIS, USA
11	Worku Teka	ARARI (Amhara Regional Agricultural Research Institute)
12	Girima Tesfahun	ARARI
13	Mulat Demeke	AAU, ETHIOPIA
14	Tegegne G/Egzeabher	AAU, ETHIOPIA
15	Habtu Assefa	ARARI
16	Samuel Beuin	ILRI (International Livestock Research Institute
17	Getachew Alemayehu	ARARI
18	Moges Girma	Rural Development Office, Amhara Regional State
19	Brhane Gebrekidan	AMAREW PROJECT, Bahir Dar, Ethiopia
20	Seid Yassin	Rural Development Office, Amhara Regional State
21	Abera Teklemariam	Rural Development Office, Amhara Regional State
22	Tewodaj Mogues	University Of Wisconsin/BASIS, USA
23	Michael Roth	University Of Wisconsin/BASIS, USA
24	Tafesse Kassa	Food Security Program Office, Amhara Region
25	Bayleyegn Azene	Bureau of Agriculture, Amhara Region